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THE CONCENTRATION OF LEAD IN THE URINE OF WORKERS AT MOUNT ISA MINES LIMITED, QUEENSLAND, WITH SPECIAL REFERENCE TO ITS VALUE IN THE DIAGNOSIS OF LEAD POISONING.

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Mount Isa, Queensland.

THE silver-lead mine of Mount Isa Mines Limited at Mount Isa, north Queensland, is one of the largest silver-lead mines in the world. The monthly production of lead bullion is approximately 3,000 tons.

From the beginning of the developmental stage in 1926 until March, 1935, the ore mined was either lead carbonate or a mixture of lead carbonate and sulphide. Subsequent to March, 1935, the ore mined for the mill has been sulphide. There has been a relatively small production of carbonate for direct smelting.

The processes carried out include mining the ore at the mine, crushing and fine grinding of the ore, and separation of lead and zinc concentrates by flotation at the mill, and smelting the lead concentrate to produce lead bullion at the smelters.

The climate is hot and, generally speaking, not humid.

In the earlier days, during the period when the ore mined and treated contained much lead carbonate, there were very numerous cases of lead poisoning, some of which were severe.

Table I shows the average number of men employed and the number of cases of compensatable lead poisoning occurring.

On September 1, 1934, a medical board consisting of three members was appointed. One of the functions of this board is the diagnosis of cases of lead poisoning.

TABLE I.

Year.	Number of Men.	Number of Cases of Compensatable Lead Poisoning.
1931	1,078	69
1932	1,162	95
1933	1,022	77
1934	1,074	11
1935 (to October 30)	1,085	22

With the improvement in mechanical dust prevention methods, increased knowledge, and better hygienic discipline, the number and severity of the cases had markedly decreased prior to the appointment of the above-mentioned medical board. Since the appointment of the board, the number of employees suffering from compensatable lead poisoning up to and including October 30, 1935, was 29. The majority of these patients have complained of or exhibited various combinations of the following signs and symptoms: loss of weight, loss of muscular strength, anæmia, pallor, malaise, nausea, vomiting, loss of appetite, arthralgia, myalgia, abdominal pain, abdominal colic, sleeplessness, headache, vertigo, constipation. There have been no cases of definite wrist-drop or of encephalopathy, and only four of severe abdominal colic since the appointment of the board.

Whereas the severer forms of lead poisoning with a known history of exposure to a lead hazard are not difficult to diagnose, in the less severe forms it is not easy to decide either as to the ætiology of the syndrome exhibited or whether the condition, if due to lead poisoning, is compensatable.

Object of the Investigation.

While it is by no means certain that a number of patients with lead poisoning exhibiting a similar syndrome to a similar degree would necessarily have the same concentration of lead in the blood and/or other tissues, it was considered that a comparison of the concentrations of lead in the tissues or body fluids of a large number of subjects who were well and who were not showing signs or symptoms although exposed to lead hazard, with the concentrations in subjects who were showing signs and symptoms of lead poisoning would be a distinct aid to diagnosis.

The lead in the urine has previously been in the blood. The lead in the fæces is made up of the lead which has been excreted by the liver into the alimentary tract in the bile, and lead which has been swallowed and has passed through the alimentary tract unabsorbed. Therefore a determination of the total lead in the fæces gives no information as to the amount of lead which may have been in such a situation as to cause signs or symptoms of lead poisoning.

Various investigators have considered the diagnostic value of the urinary lead excretion.

Badham[1] states:

> In lead poisoning one expects to find 0·10 to 0·30 milligramme per litre, but occasionally the lead excretion is quite low and may not exceed the normal figure. This failure to excrete lead is most marked in cases of severe anæmia. The excretion of large amounts up to 1·0 milligramme per litre is sometimes seen when there has been a great intake of lead. If such a large amount is found on more than one occasion, lead poisoning can be forecasted if not already present.

Mathew[2] states that, with the exception of one case (in which an initial estimate of 1·0 milligramme per litre was followed by estimates of 0·6 and 0·32 milligramme per litre at successive estimates during the three succeeding weeks, the patient, though complaining of symptoms suggestive of lead poisoning, carrying on with strenuous sport), the presence of more than 0·30 milligramme per litre in all cases was accompanied by definite evidence of lead poisoning. He adds that not all examinees with definite evidence of lead poisoning showed so great an amount of lead in the urine.

Brown,[3] in a study of 26 cases of lead poisoning among oxy-acetylene welders engaged in ship-breaking, found that 50% of the subjects showed an excretion above 0·2 milligramme of lead per litre.

Kehoe, Thamman and Cholak[4] state that the occurrence of lead poisoning may be expected under conditions in which lead is excreted at a mean rate above 1·1 milligrammes per day in the fæces and 0·21 milligramme per litre in the urine.

Aub, Fairhall, Minot and Reznikoff[5] give a table showing the lead excretion per three-day period of a number of patients with chronic plumbism who were in hospital.

The following shows the urinary lead excretion of these patients calculated for one day.

Milligramme.	Milligramme.	Milligramme.
0·08 ..	0·093 ..	0·24
0·14 ..	0·05 ..	0·19
0·09 ..	0·15 ..	0·08
0·26 ..	0·10 ..	0·04
0·09 ..	0·08 ..	0·13
0·15 ..	0·086 ..	

Mean, 0·12 milligramme.

No statement is made as to the time which had elapsed since exposure to lead hazard.

Lynch, Slater and Osler[6] give the urinary lead analysis of two cases of lead poisoning. The first subject who showed Burton's line and who had extensor weakness had 0·29 and 0·26 milligramme of lead per litre in two samples. The second subject who had lead colic and Burton's line showed 0·14 and 0·10 milligramme per litre. No data were given as to the time which had elapsed since exposure to the lead hazard.

Schmidt and Weyrauch[7] state that a concentration of 0·1 milligramme in a twenty-four hour quantity of urine is the limit above which clinical symptoms of lead poisoning were mostly found and that negative results in only one analysis have no significance.

Fretwurst and Hertz[8] state that clinical signs of lead poisoning are shown by subjects with 0·00 to 0·13 milligramme of lead per litre.

Eden[9] quotes a subject suffering from headache, drowsiness, vomiting and optic atrophy who showed 0·11, 0·12, 0·35 milligramme in three separate twenty-four hour specimens.

Behrens and Taeger,[10] in an investigation of 185 hospital patients with no known exposure to lead, found urinary lead concentrations up to 0·02 milligramme per litre. In one case of lead poisoning the values were from 0·151 to 0·394, and in one suspected case 0·152. They state that in real cases of lead poisoning values ranged from 0·033 to 0·085 milligramme per litre.

As to the values which may be expected in cases in which there has been no known exposure to lead hazard, Badham[1] states that the average value for several hundred analyses of people in Sydney was 0·02 milligramme. Similarly in London the value was 0·049, and for country people 0·023. In Berlin about the same values were found as those for Sydney people.

Kehoe, Thamman and Cholak[11] state that the normal adult American excretes lead at the rate of 0·02 to 0·08 milligramme per litre. The same authors[12] give results of an investigation into the lead excretion of persons concerned with the handling of motor spirit containing tetra-ethyl lead; these are shown in Table II.

Table II.

Occupation.	Number of Subjects.	Lead in Milligrammes per Litre of Urine: Average Value.
Filling station attendants	56	0·071
Tank wagon handlers	50	0·089
Barrel fillers not exposed to leaded gasoline	27	0·058
Barrel fillers exposed to leaded gasoline	22	0·052
Medical students	65	0·078
Filling station attendants	72	0·081
Garage mechanics	26	0·077

In some of the investigations quoted above no reference was made to the time which had elapsed between the taking of the sample of urine and the last exposure to the lead hazard, and in none of them is reference made to the climatic conditions at the time of the testing.

It was decided to investigate the urinary lead concentration in relation to the occurrence of lead poisoning at Mount Isa, since the climatic conditions there are probably very different from those at various centres where the above-mentioned investigations were carried out.

In order to do this, a comparison of the urinary lead concentration of workers suffering from lead poisoning with those of workers exposed to generally similar hazard but who were fit and showed no signs or symptoms, was necessary. To make such a comparison legitimate it was necessary to consider also the effect of climatic conditions on the value determined, since the concentration of lead in the urine might be expected to be different during the extreme heat of summer from the value obtained in the relatively cool winter, assuming that other factors remained constant.

One might expect the concentration of lead in the urine in any particular case to depend very largely on the concentration of lead in the atmosphere breathed by the worker concerned. Since it is obviously impossible to assure first of all the constancy of this atmospheric lead concentration over a period of time which would include sufficiently variable climatic conditions, and also equally efficient kidney function at different times in a few selected individuals, it was considered that the best way to determine whether climatic conditions had any significant effect, was to examine samples from a large number of subjects collected under different climatic conditions.

The effect of climatic conditions on the volume of urine passed is shown in Table III.

Table III.

(*Subject Sedentary Worker, who Drank Freely of Water as Appetite Required.*)

Date.	Average Temperature (in Degrees Fahrenheit).	Volume of Urine Passed in Twenty-four Hours (in Cubic Centimetres).
8/1/35–9/1/35	92·7	800
9/1/35–10/1/35	95·3	730
10/1/35–11/1/35	96·6	600
11/1/35–12/1/35	94·0	900
12/1/35–13/1/35	96·0	850
13/1/35–14/1/35	92·7	1,000
14/1/35–15/1/35	88·3	1,100
15/1/35–16/1/35	88·6	1,050
16/1/35–17/1/35	92·3	850
17/1/35–18/1/35	91·7	600
18/1/35–19/1/35	81·7	1,100
19/1/35–20/1/35	78·3	2,330
20/1/35–21/1/35	77·6	2,062
21/1/35–22/1/35	85·6	1,150
22/1/35–23/1/35	86·6	1,150
23/1/35–24/1/35	87·0	1,275
24/1/35–25/1/35	89·3	1,050
25/1/35–26/1/35	86·0	1,150
26/1/35–27/1/35	90·3	1,900
27/1/35–28/1/35	92·0	—
28/1/35–29/1/35	96·4	1,100
29/1/35–30/1/35	96·5	700
30/1/35–31/1/35	97·1	750
31/1/35–1/2/35	92·5	750
1/2/35–2/2/35	87·4	1,100
2/2/35–3/2/35	85·9	1,100
3/2/35–4/2/35	91·8	1,200
4/2/35–5/2/35	90·3	900
27/6/35–28/6/35	59·5	3,280

Thus even in one summer month there occurred more than a threefold variation in the volume passed per day, whereas there was as great as a fivefold variation when a typical winter day's output was compared with that of a hot summer's day.

The temperatures were computed from the average temperatures during day, afternoon and night shifts at the power-house, which were determined from half-hourly readings.

Scope of the Investigation.

In the course of this investigation nearly 200 analyses of the urine of 139 different persons have been made. I am indebted to the Assay Office of Mount Isa Mines Limited for 21 of these analyses.

The analyses include 85 from subjects exposed to lead hazards of varying degrees, but who were fit for work, and 29 from subjects with lead poisoning.

Method of Collection of Samples.

Since it was not practicable to obtain twenty-four hour samples of urine from men engaged in their ordinary work, the method adopted was to supply a bottle into which the subject passed a quantity of urine after leaving the bath-house and changing from working clothes. This procedure was repeated on several successive days. Each bottle contained a few cubic centimetres of pure redistilled chloroform for preservative purposes, and was provided with a cotton wool covering to the cork. This covering was itself covered with a thick brown paper cap, which was tightly held in place by a stout rubber band, effectively preventing contamination by dust. The volume collected and analysed in each case was usually about 700 cubic centimetres.

The average temperatures on the days on which each collection was made were obtained from the average temperatures during day, afternoon and night shifts, and the average temperature during the period in which each collection was made was then calculated. The average temperatures during day, afternoon and night shifts were determined from half-hourly readings at the power-house.

In the case of applicants for compensation, the samples were collected in a similar manner just after the application was made.

Analytical Method Used.

In the majority of cases the method used was a modification of the method of Taylor,[13] in which the lead is carried down by co-precipitation and/or adsorption on calcium oxalate. In the modified method the oxalate precipitate is evaporated to dryness in a silica dish with concentrated nitric acid instead of hydrochloric acid. The dried residue is then ashed in the muffle at a low red heat or just below this temperature preferably. A few determinations were done by Taylor's method, and those determinations which were carried out by the Assay Office were done by the method of Avery, Hemingway and Anderson.[14]

To test the method of Taylor, three separate amounts of 0·1 milligramme of lead as lead acetate were taken and added to small volumes of distilled water and the lead was then determined. The amounts found were 0·10, 0·10, 0·12 milligramme respectively.

That the values of the urinary lead concentration determined by Taylor's method showed good agreement with those found by the much slower and more tedious method of Avery, Hemingway and Anderson was shown by running duplicate determinations by the two methods with the results shown in Table IV.

With the modified method six determinations could be done at once, since such careful control of the temperature was not necessary, and six precipitates could be ashed simultaneously in the muffle furnace.

TABLE IV.

Number of Test.	By Avery's Method. (Milligrammes per Litre.)	By Taylor's Method. (Milligrammes per Litre.)
17	0·13	0·116
18	0·31	0·298

The agreement between the values found by the modified method and by Taylor's method was quite satisfactory, as shown by Table V.

TABLE V.

Number of Experiment.	Milligrammes of Lead per Litre of Urine.		
	By Taylor's Method.	By Modified Taylor's Method.	Difference as Percentage of Result by Taylor's Method.
32	0·089	0·090	1·1
34	0·099	0·108	9·0
35	0·044	0·051	16·0
36	0·06	0·056	−7·0
38	0·039	0·037	−5·1
39	0·208[1]	0·238	15·0

[1] Expected to be slightly low.

The reagents used were carefully purified, and frequent blank determinations were made on the reagents and distilled water used, and corrections were applied where necessary.

Diagnosis of Lead Poisoning Cases.

The diagnosis of lead poisoning in the 29 cases was agreed upon by at least two members of the Medical Board and was based on the subjective symptoms, clinical signs, and on blood examination, which in all cases included a stippled cell count, and determination of the ratio of large to small lymphocytes, and in many cases a red cell count and determination of the hæmoglobin percentage.

With the exception of Cases I and VIII, the diagnosis was arrived at without reference to the urinary lead concentration.

Results of Investigation.

The results of the investigation are summarized in the following tables.

Table VI shows the concentration of lead in the urine of: (*a*) workers who were not showing signs or symptoms of lead poisoning; (*b*) of applicants to the Board who were not compensated; and (*c*) of workers in the various departments who wanted blood films examined and in whose cases urinary lead determinations were made (of the 17 subjects in the last-mentioned group, 13 were from the mine, one was from the smelter, and three were surface workers); (*d*) headquarters office (these had had no exposure to lead hazard other than that due to working on the mine's lease, at a considerable distance from the mine, mill and smelter).

TABLE VI.

Location of Subject.	Number of Subjects.	Average Temperature (in Degrees Fahrenheit).	Average Concentration of Lead in Milligrammes per Litre.
(a) Mine	20	77·75	0·122
(a) Mill	24	74·7	0·114
(a) Smelter	21	75·5	0·117
(a) Assay Office	3	93·3	0·127
Total	68	Average: 76·67	Average: 0·118
(b) Applicants not compensated and (c) Non-applicants	17	83·84	0·115
Total	85	Average: 78·1	Average: 0·118
(d) Headquarters Office	16	80·38	0·087

Table VII shows similar data in regard to subjects suffering from lead poisoning of a compensatable degree.

TABLE VII.

Number of Case.	Place of Occupation.	Average Temperature (in Degrees Fahrenheit).	Concentration of Lead in Urine in Milligrammes per Litre.
1	Smelter.	79·7	0·40
2*	Mine.	84·1	0·206
3	Surface.	76·0	0·26
4	Mine.	76·0	0·17
5	Mine.	85·2	0·31
6	Mine.	83·4	0·17
7	Mine.	94·4	0·38
8	Mine.	97·4	0·16
9	Mine.	96·5	0·26
10	Mine.	89·0	0·11
11	Mine.	70·14	1·215
12	Mine.	66·27	0·107
13*	Mine.	74·0	0·03
14*	Mine.	69·9	0·05
15	Mine.	61·05	0·15
16*	Mine.	70·5	0·06
17	Smelter.	79·0	0·044
18	Mine.	79·3	0·233
19	Mine.	79·3	0·265
20	Mine.	79·47	0·254
21	Machine shop.	76·5	0·143
22	Mine.	76·8	0·27
23	Mine.	75·6	0·20
24	Mine.	81·4	0·233
25	Mine.	84·65	0·38
26*	Mine.	87·0	0·19
27	Mine.	88·0	0·296
28	Mine.	88·9	0·208
29	Assay Office.	97·0	0·255
Average ..	.. .. ..	80·56	0·242

In the case of Number 2, the subject had been removed from a lead hazard for twelve months prior to the taking of the sample, and in the case of Number 26 the interval was three months. All other test samples were taken while the subject was still working in the hazard, or within a day or two of his leaving it.

In cases 13, 14 and 16 the subjects had been receiving out-patient treatment for several weeks prior to the test.

If Numbers 2, 13, 14, 16 and 26 are excluded (they are marked by an asterisk in the table), the average becomes 0·27 milligramme per litre.

If the high value in the case of Number 11 is excluded in determining the average, this becomes 0·207 milligramme per litre for all other cases. If in addition Numbers 2, 13, 14, 16 and 26 are excluded, the average becomes 0·228 milligramme per litre.

The occupational distribution of the subjects and the average number of men employed in the various departments was as shown in Table VIII.

TABLE VIII.

Group.	Department.					Total.
	Mine.	Mill.	Smelter.	Mechanical.	General.	
Number of men	551	73	171	183	144	1,124
Number of lead poisoning cases	24	0	3[1]	1	1	29

[1] Including one case from Assay Office.

Thus the number of cases relative to the number of men employed is far higher in the mine than in any other department.

Influence of Length of Employment on Urinary Lead Concentration.

Tannahill,[15] in his investigation into the urinary lead concentration of workers at Broken Hill showed that there was no definite relation between the urinary lead concentration and the period of employment in the mine.

The same lack of correlation has been observed in the present investigation. This is only to be expected, since the employee may work at many different places in the department to which he is attached, and in any case the dust hazard in any particular situation may not remain constant, even were the personal factor the same in all cases.

However, in the comparison of urinary lead concentration of compensated cases and fit workers, the average period of employment in the two classes is approximately equal, being twelve months and ten and a half months respectively, so that any effect due to period of employment is negligible.

The Influence of Temperature.

The influence of temperature in the urinary lead concentration of fit subjects is shown in Table IX.

TABLE IX.

Temperature Range in Degrees Fahrenheit.	Number of Subjects.	Average Temperature (in Degrees Fahrenheit).	Average Concentration of Lead in Milligrammes per Litre.
50·0–59·9	12	56·9	0·069
60·0–69·9	18	67·0	0·110
70·0–79·9	10	75·0	0·127
80·0–89·9	23	85·3	0·114
90·0–99·9	22	92·6	0·149
Total	85	—	—

The number of subjects is not so great as would be desirable in order to make the results of definite statistical significance, considering the other variable factors concerned, but they appear to show that there is a very definite effect at the lowest and highest temperature ranges concerned. Thus a urinary lead concentration of 0·15 milligramme per litre obtained in the cool winter months would be of much greater diagnostic importance than a similar value found during the hottest part of the year. The temperature distributions in the case of the works survey (that is, fit subjects) and of the compensatable lead poisoning cases are shown in Table X.

Table X.

Temperature Range in Degrees Fahrenheit.	Number of Subjects.		Percentage Distribution.	
	Survey, Applicants Not Compensated, Non-Applicants.	Compensated Cases.	Survey, Applicants Not Compensated, Non-Applicants.	Compensated Cases.
50·0–59·9 ..	12	0	14·1	0
60·0–69·9 ..	18	3	21·2	10·3
70·0–79·9 ..	10	13	11·7	44·8
80·0–89·9 ..	23	10	27·1	34·5
90·0–99·9 ..	22	3	25·8	10·3
Total	85	29	—	—

This indicates that in the compensated cases the percentage of samples obtained in the lowest and highest temperature ranges is very much less than in the works survey. The absence of samples obtained during the lowest temperatures would tend to make the average value for all determinations higher than in the works survey, whereas the small percentage of samples obtained in the highest temperature range would have the opposite effect.

On the whole, it is considered that any difference in the average value of the urinary lead concentration for compensated cases, when compared with the average value for fit subjects, which may be due to lack of closer conformity in the temperature distributions in the two series, is not sufficiently great to make a comparison unjustifiable.

Table XI shows the percentage distribution of the values of the urinary lead concentration of the fit subjects and of those suffering from compensatable lead poisoning.

The comparison between values of urinary lead concentration of fit workers and of those with compensatable lead poisoning is more strikingly illustrated by Table XII, which shows the percentage of subjects with urinary lead concentration equal to or greater than 0·20 milligramme per litre and 0·25 milligramme per litre in the two series.

Out of 114 subjects, 24 showed urinary lead concentrations equal to or greater than 0·20 milligramme per litre; of these, 17, or 70·8%, were compensatable lead poisoning cases. Thirteen showed concentrations equal to or greater than 0·25 milligramme per litre; of these, 12, or 92·3%, were compensatable lead poisoning cases.

Table XI.

Concentration of Lead in Urine in Milligrammes per Litre.	Survey, Applicants Not Compensated, Non-Applicants.		Compensated Cases.			
	Number of Subjects.	Percentage.	All Cases.	Percentage.	Omitting Nos. 2, 13, 14, 16 and 26.	Percentage.
0·00–0·049 ..	3	3·53	2	6·9	1	4·16
0·05–0·099 ..	33	38·82	2	6·9	0	0
0·10–0·149 ..	28	32·94	3	10·34	3	12·5
0·15–0·199 ..	14	16·47	5	17·24	5	20·8
0·20–0·249 ..	6	7·06	5	17·24	4	16·6
0·25–0·299 ..	0	0·00	7	24·14	6	25·0
0·30–0·349 ..	1	1·17	1	3·44	1	4·16
0·35–0·399 ..	0	0	2	6·9	2	8·32
0·40–0·449 ..	0	0	1	3·44	1	4·16
1·25–1·299 ..	0	0	1	3·44	1	4·16
Totals ..	85	—	29	—	24	—

Table XII.

Subject Type.	Number of Subjects.	Number of Cases in which Urinary Lead Concentration Equal to or Greater than—		Percentage of Cases in which Urinary Lead Concentration Equal to or Greater than—	
		0·20 Milligrammes per Litre.	0·25 Milligrammes per Litre.	0·20 Milligrammes per Litre.	0·25 Milligrammes per Litre.
Survey, applicants not compensated, non-applicants ..	85	7	1	8·2	1·17
Compensated cases (all cases)	29	17	12	58·6	41·4
Excluding Numbers 2, 13, 14, 16 and 26	24	16	12	66·6	50·0

The concentration of lead in the urine is definitely of value when the samples are taken while the subject is still exposed to the lead hazard or shortly after removal therefrom.

It may also be of value even after a considerable period has elapsed since exposure to the hazard, since in severe cases the value may still be well above normal or above that found in fit subjects.

A low value, for example 0·04 to 0·05 milligramme per litre, does not exclude a diagnosis of lead poisoning, especially if only a single sample is analysed.

Summary.

The concentration of lead in the urine of 29 subjects of compensatable lead poisoning has been determined, and also of 85 subjects who were fit and exposed to generally similar hazards.

The average value in the case of fit subjects was 0·12 milligramme per litre.

The average value in the case of subjects suffering from compensatable lead poisoning from whom samples were taken while they were still exposed to the hazard or within a few days of leaving it, and

who had undergone no treatment previous to reporting sick, was 0·23 milligramme per litre.

Out of 114 subjects, 24 showed concentrations equal to or greater than 0·20 milligramme per litre; of these, 17, or 70·8%, were suffering from compensatable lead poisoning.

Thirteen subjects showed concentrations equal to or greater than 0·25 milligramme per litre; of these, 12, or 92·2%, were suffering from compensatable lead poisoning. Of the subjects with compensatable lead poisoning, 50% showed urinary lead concentrations equal to or greater than 0·25 milligramme per litre.

The results confirm those of Kehoe, Thamman and Cholak,[4] who considered that lead poisoning could be expected when the urinary lead excretion was 0·21 milligramme per litre, and of Brown,[3] who found that 50% of the subjects of lead poisoning had urinary lead concentrations above 0·20 milligramme per litre.

Acknowledgements.

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References.

(1) C. Badham: "Basophilia and Lead Excretion in Lead Poisoning", THE MEDICAL JOURNAL OF AUSTRALIA, December 16, 1933, page 816.
(2) R. Y. Mathew: "The Blood of Workers Exposed to Lead", THE MEDICAL JOURNAL OF AUSTRALIA, February 16, 1929, page 208.
(3) E. W. Brown: "Study of Lead Poisoning among Oxy-Acetylene Welders in the Scrapping of Naval Vessels", *Journal of Industrial Hygiene*, 1926, Number 3.
(4) R. A. Kehoe, F. Thamman and J. Cholak: "Lead Absorption and Excretion in Certain Lead Trades", *Journal of Industrial Hygiene*, Volume XV, Number 5, 1933, page 306.
(5) J. C. Aub, L. T. Fairhall, A. S. Minot and P. Reznikoff: "Medical Monographs: Lead Poisoning", 1926.
(6) G. Roche Lynch, R. H. Slater and T. G. Osler: "The Determination of Lead in Biological Materials, with Special Reference to Bone", *The Analyst*, Volume LIX, page 787.
(7) P. Schmidt and F. Weyrauch: "Diagnosis of Lead Poisoning in the Light of Modern Research", abstracted in *Journal of Industrial Hygiene*, Volume XV, Number 4, 1933, page 255.
(8) F. Fretwurst and A. Hertz: *Archiv für Hygiene*, Volume CIV, 1930, page 215; abstracted in *Journal of Industrial Hygiene*, Volume XIII, 1931, page 118.
(9) K. C. Eden: "A Case of Lead Encephalopathy", *The Lancet*, March 2, 1933; abstracted in *Journal of Industrial Hygiene*, Volume XVII, May, 1935.
(10) B. Behrens and H. Taeger: *Zeitschrift für die gesamte experimentelle Medizin*, Volume XCVI, 1935, page 282; abstracted in *Journal of Industrial Hygiene*, Volume XVII, Number 5, 1935.
(11) R. A. Kehoe, F. Thamman and J. Cholak: "On the Normal Absorption and Excretion of Lead. II. Lead Absorption and Lead Excretion in Modern American Life", *Journal of Industrial Hygiene*, Volume XV, Number 5, 1933, page 273.
(12) R. A. Kehoe, F. Thamman and J. Cholak: "The Appraisal of the Lead Hazards Associated with the Distribution and Use of Gasoline containing Tetra-Ethyl-Lead, Part I", *Journal of Industrial Hygiene*, Volume XVI, Number 2, 1934, page 100.
(13) C. Badham and H. B. Taylor: Extract from "Report of Director-General of Public Health, New South Wales" for year ending December 31, 1925. Section 1-c, Industrial Hygiene, "Lead Poisoning", page 54.
(14) D. Avery, A. J. Hemingway and V. G. Anderson: "Determination of Minute Amounts of Lead in Water, with Notes on Certain Causes of Error", *Proceedings of the Australian Institute of Mining and Metallurgy*, Number 43, 1921.
(15) R. W. Tannahill: "Lead Excretion of Workers at the Smelters, Port Pirie", THE MEDICAL JOURNAL OF AUSTRALIA, February 16, 1929, page 205.

CANCER OF THE LUNG: A CLINICAL SURVEY OF ONE HUNDRED CASES.[1]

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Introductory.

THIS paper is based on an analysis of the case notes of 100 patients admitted to the wards of the Royal Prince Alfred Hospital during twenty-five years, July 1, 1910, to June 30, 1935. As the number, 100, may suggest a careful selection of cases, a word of explanation is required. The original object was to find as many cases as possible in the records satisfying the diagnosis of primary carcinoma of the lung. Up to the end of December, 1934, 96 cases were found; this was the original survey. During the next six months observation of patients admitted to the wards gave three more acceptable cases. It was then decided to endeavour to make the number up to 100, and all records were reexamined, with the selection of one more case previously omitted; this was the only selected case, the others being consecutive. In all, 272 case records were examined, including all those at present in the hospital records under "Cancer of the Lung" and "Mediastinal Tumour". Many cases were of pulmonary metastases, many were readmissions. In some it was felt that the data were insufficient to justify the diagnosis. In the final 100 cases the diagnosis was proven *post mortem* in 43 and by biopsy in 12. The remaining 45 cases rest on a clinical diagnosis; these were all carefully considered and a number were under my own observation. In all, the symptoms, X ray appearances and subsequent history combined, in my opinion, to eliminate any doubt as to diagnosis.

It is perhaps of passing interest to note that of 76 cases now filed in the records as "mediastinal tumour", six were found *post mortem* to have a primary bronchial carcinoma. Ten others were accepted on clinical grounds; no doubt this number might have been greatly increased. Three other cases, proven at autopsy to have cancer of the lung, will remain in the records as cases of pulmonary tuberculosis, bronchiectasis and duodenal ulcer respectively. There may be others in which the final diagnosis has not yet been correlated with the *post mortem* findings; they are probably few.

The main purpose of this paper is to stimulate interest in the problem of earlier diagnosis of carcinoma of the lung. Hitherto this disease, once diagnosed, has been of academic interest; the patients have all died. Recent surgical progress indicates that there is now a practical side to the question. It seems probable that the disease can be cured by extirpation, even though it be in but a very small percentage of cases. Early diagnosis leading to radical treatment: this is an ideal for the future.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on August 29, 1935.

Annual Admissions.

Table I shows the annual admissions during the twenty-five years; the rapid increase during the last ten years is strikingly illustrated in Chart I.

Table I.

One Hundred Cases Admitted to the Royal Prince Alfred Hospital during Twenty-five Years July, 1910, to June, 1935.

1910–11	0	1923–24	1
1911–12	2	1924–25	3
1912–13	1	1925–26	2
1913–14	2	1926–27	8
1914–15	2	1927–28	5
1915–16	0	1928–29	5[1]
1916–17	3	1929–30	7
1917–18	0	1930–31	8[2]
1918–19	2	1931–32	6[2]
1919–20	2	1932–33	14[2]
1920–21	3	1933–34	10[2]
1921–22	1	1934–35	9
1922–23	3		

[1] Cancer Clinic opened November, 1928.
[2] Closure of number of beds, February, 1931, to October, 1933.

It will be noted that in consecutive five-yearly periods the numbers are: 7, 7, 11, 27 and 48. Practically half the total were admitted in the last five years. There were as many cases admitted in one year (1932–33) as in the first ten years.

There has been much discussion as to whether the increased incidence of carcinoma of the lung is apparent or real. Generally, however, it is agreed that though increased diagnostic facilities and hospital investigation of patients have played a great part, there is strong evidence that the increase is to some extent real. These figures support this contention, especially the fact that practically half of the cases in this series have occurred in the last five years. There has been no outstanding diagnostic improvement in this period. That the opening of the cancer clinic has played any part in the increase may be disregarded for several reasons.

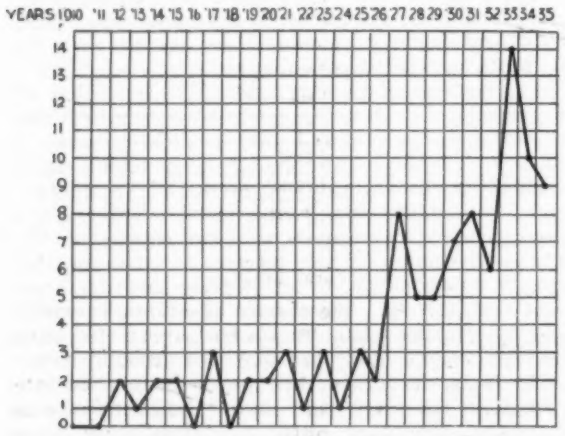

Chart I.

First, the figures show no rise in the opening year, as might have been expected from the resultant publicity. Secondly, most cases were admitted to hospital for investigation and diagnosis. However, the one obvious fact is this: bronchial carcinoma is not a rare disease, and the possibility of its presence should be borne always in mind.

Age Periods.

Table II and Chart II, illustrating the grouping of cases into age periods, show figures which correspond closely to those given by other writers.

Table II.

One Hundred Cases of Carcinoma of the Lung, arranged in Age Periods.

Age.	*P.*	*B.*	*C.*	Total.
21–30	2	1	1	4
31–40	3	1	10	14
41–50	8	5	10	23
51–60	18	3	11	32
61–70	9	2	8	19
Over 70	3	0	5	8
Total	43	12	45	100

P = Diagnosis confirmed *post mortem*. *B* = Diagnosis confirmed by biopsy.
C = Diagnosis made on clinical evidence. There were 87 males and 13 females.

Over half the cases occurred between the ages of 41 and 60 years. None was found under the age of 20. Cases have occasionally been reported in the literature below this age, even in young children. In some the neoplasm has arisen from an embryonic rest. In the series, 87 patients were males and 13 females, giving a proportion in favour of males of 6·7 to 1, a figure somewhat higher than the usual.

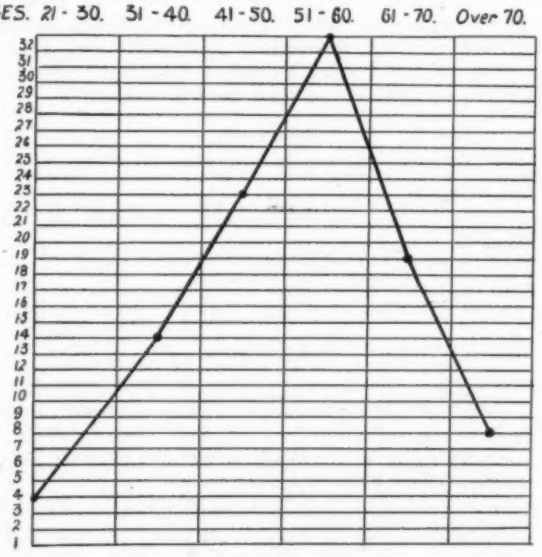

Chart II.

Duration of Symptoms.

As regards the average duration of symptoms (see Table III), I believe these figures indicate too short an interval. A careful history will often elicit earlier forgotten episodes, such as pain in the side or back. My observations incline me to believe that the average duration from first symptom to death is more nearly two years, possibly longer. The point to be emphasized is that there is often a latent period wherein early diagnosis might lead to radical treatment and cure.

TABLE III.

The Age Incidence and Duration of Symptoms in One Hundred Cases of Carcinoma of the Lung.

	Average Age.
At time of death	54·1
At time of diagnosis by biopsy	49·0
At time of diagnosis clinically	52·1
Females	51·2
Males	52·8

NOTE.—The oldest patient in the series was aged 74 years, the youngest 23 years; both were examined *post mortem*. The average duration of symptoms, from the first symptom to death, in 43 cases was 8½ months; from the first symptom to admission in 97 cases, seven months.

Occupational Incidence.

Though the numbers are very few, it is hard to avoid comment on the high percentage (38%) of those exposed to noxious inhalatory stimuli in their work, or on the percentage (25%) whose occupation was predominantly an outdoor one (see Table IV); 75% of males with stated occupation could be placed in these two groups. Factory operatives, shop assistants and clerks were conspicuous by their rarity in this series. Of the nine miners, five had worked for long periods in quartz, for gold, copper or tin. That four were coalminers does not, of course, exclude the likelihood that they were exposed for varying periods of time to siliceous dusts.

TABLE IV.

Stated Occupation of Eighty-five Males Suffering from Carcinoma of the Lung.

Miners, including siliceous (5) and coal (4)	9
Labourers	9
Workers in building trade, including carpenters (4) and bricklayers (2)	9
Iron workers	4
Engineers	3
Motor mechanics	3
Printer's engraver (fumes)	1
Farmers and others engaged in agriculture	9
Seamen	4
Other outdoor workers	12
Other indoor workers	16
Nondescript	6
Total	85

NOTE.—The 13 females were engaged in domestic duties.

Those who believe in the fallacy of statistics will be pleased to note that in this series at least housework appears as the most dangerous of occupations. There is as yet no agreement among workers that there are any definite predisposing occupational causes of cancer of the lung, with the notorious exception of the Schneeburg miners. The figures presented here are suggestive; but they would have to be multiplied many times to be of value.

Pathology.

Little need be said on the pathological side, as this will be dealt with by another speaker. Brief pathological data are given in Table V. The frequency of involvement was approximately equal in each lung. There seems to be no reason why this should not be so, though in some series there is a preponderance in one or other lung. My study of the hospital records has convinced me of the truth of the following dogmatic statements: (i) all primary newgrowths of the lung are bronchial carcinomata; (ii) the commonest mediastinal tumour in the adult is the oat-celled carcinoma of the bronchus; (iii) endothelioma of the pleura is extremely rare. I was unable to satisfy myself that I found a single case of endothelioma of the pleura in the 272 records examined. Metastasis is shown to be very common; this is, of course, a constant finding in all papers on the subject. It must certainly be present, though occult, in many cases when first seen, usually in the regional lymph glands. This fact is the greatest curb to enthusiasm for any effective treatment, and it must always keep the proportion of operable cases at a low figure.

TABLE V.

Notes on Pathology in One Hundred Cases of Cancer of the Lung.

		Number of Cases.
Site of lesion	Right lung	47
	Left lung	53
Diagnosis	*Post mortem*	43
	Biopsy	12
	Clinical	45
Biopsy the sole method of diagnosis	Thoracotomy	4
	Section of gland	3
	Bronchoscopy	4
	Section of skin nodule	1
Biopsy findings confirmed *post mortem*	Thoracotomy	2
	Section of gland	1
Metastasis observed *post mortem*	Various organs	33
Metastasis revealed by biopsy	Gland	3
	Skin	1
Metastasis revealed by clinical examination	Gland	3
	Bone	2
	Skin	1
	Brain	1
Pleural effusion	Clear	23
	Blood-stained	9
	Purulent	2

Pleural Effusion.

An effusion into the pleural cavity was noted in one-third of the cases. This is the average frequency of this complication; but purulent effusion is relatively less common in this series. A clear effusion does not, of course, indicate pleural involvement by newgrowth. It is often a mechanical transudate from pressure on venous channels, and it may appear quite early. It would appear, therefore, that it does not of itself contraindicate surgical measures. A hæmorrhagic effusion, on the other hand, is diagnostic of a malignant pleuritis. (This does not imply, of course, that all hæmorrhagic effusions are of neoplastic origin.) The value of the procedure known as gas replacement in the diagnosis of a pleural effusion is to be

remembered. By this method practically all the fluid can be withdrawn from the chest, unmasking often the lung structure and nearly always allowing of a correct radiological interpretation of the mediastinal shadow.

It is opportune to interpolate here a note on the occasional value of artificial pneumothorax. By this means it may be shown whether the mass is intrapulmonary or extrapulmonary, a point of considerable importance both in diagnosis and possible treatment. Artificial pneumothorax is also, of course, the correct procedure as a preliminary to lobectomy.

Bronchoscopy.

Bronchoscopy was performed in nine cases. A positive diagnosis was made in four of these; mediastinal tumour was diagnosed in two, and no abnormality was found in three. The figure is surprisingly small. Though a certain responsibility rests on the physician for this, the bronchoscopists cannot go scot-free. It is not that they have been unwilling to cooperate; but other factors have intruded. Sometimes perhaps the surgeon has not exhibited that great delicacy of touch of which he is capable, and the patient returns to the ward just a little the worse for wear. There may be a note on the consultation sheet stating that the surgeon would like to look again next week, as the hospital bronchoscope was not very good, or the light failed, or some other trifling mishap intervened to prevent the consummation of a tedious and somewhat unpleasant examination. Unfortunately, the patient often refuses to have a "second helping" and the kind-hearted physician agrees. Perhaps when the next patient comes along the physician is not quite so ready to invoke the aid of the bronchoscopist, preferring less certain but less irksome methods of diagnosis.

But I speak of the bad old days. Bronchoscopes are greatly improved, technique and teamwork also, and soon in this country, as abroad, the bronchoscopist will come into his own. It has been stated recently that 85% of all neoplastic lesions can be seen by the bronchoscope.

Symptomatology.

In the table of principal symptoms and signs it is seen that there are some which appear with such frequency as to justify their grouping as "the cardinal five". These are cough, dyspnœa, pain, wasting and hæmoptysis. It is to be remembered, however, that the cases were nearly always advanced, many being in the last stage. Diagnosis should be possible long before these five symptoms are combined. I would regard the important signal symptoms as hæmoptysis and thoracic pain, and would suggest that, if one or other presents in a patient of middle age, the possibility that the cause is a newgrowth must be thought of. The fact is still awaiting general appreciation that hæmoptysis is not to be regarded as tuberculous in the absence of positive evidence until all other causes have been excluded. Wasting is almost always a late symptom. In fact, the absence of cachexia in a doubtful case rather favours a diagnosis of bronchial carcinoma.

TABLE VI.

Principal Symptoms in One Hundred Cases of Cancer of the Lung.

Manifestation.	Number of Cases.	
Cough	81	[1]
Dyspnœa	66	[1]
Pain	50	[1]
Wasting	45	[1]
Hæmoptysis	43	[1]
Laryngeal palsy	14	[2]
Œdema	13	[2]
Dysphagia	9	[2]
Cyanosis	7	[2]
Clubbing	4	
Hypertrophic pulmonary osteoarthropathy	3	

[1] The cardinal five.

[2] Pressure symptoms.

NOTE.—Of the symptoms labelled "the cardinal five", all five were present in 12 cases, four in 21 cases, three in 33 cases, two in 20 cases, and one only in nine cases. In five cases there were no pulmonary symptoms.

Some symptoms, such as expectoration of sputum, pyrexia and tachycardia, have been omitted as of no great significance in diagnosis.

I have grouped four as pressure symptoms: laryngeal paralysis, œdema of the chest wall, arm or side of the neck, dysphagia and cyanosis. Almost always they indicate mediastinal involvement. Often they were so outstanding as to lead to the diagnosis of mediastinal tumour, the primary growth being overlooked. Pressure symptoms would seem to contraindicate any surgical treatment, though the possibility of a benign tumour's causing them is always to be thought of. If a doubt exists, exploratory thoracotomy is surely the correct procedure. More than once has a cyst, hydatid or dermoid, been discovered and removed unexpectedly in this wise, to the infinite satisfaction of both surgeon and patient.

Clubbing of the fingers is really a common sign. Davidson found it in 30% of the Brompton cases. It is not looked for often enough, and I regard it as of diagnostic value in a doubtful case when bronchiectasis has been excluded.

Hypertrophic pulmonary osteoarthropathy was first described by Pierre Marie in 1890. It is a rare but very interesting condition, and it is to be found as a complication in one or two cases in every series of lung carcinoma. It is hoped to discuss the three cases of this series more fully in another place. Two were treated originally as rheumatoid arthritis and one as syphilitic periostitis. The subsequent history and X ray findings in two and a biopsy in one revealed the true cause of the bony changes. It is doubtful if the ætiology and pathology of this condition are yet fully understood. Usually it is regarded as a type of ossifying periostitis from chronic irritation. But in cases such as those just mentioned, there are grounds for believing that it may be a generalized involvement of all the long bones in a metastatic malignant periostitis.

Physical signs were very variable and did not permit of tabulation. As a rule, if present, they

were those of partial collapse of one lobe, or of complete atelectasis of one lung, or of the presence of fluid. Signs, of course, may be entirely absent with obvious radiological evidence.

In the early diagnosis of bronchial carcinoma I should regard signs as of no great value, with two exceptions: (i) unilateral signs in a patient with symptoms of bronchitis are suggestive of neoplasm, as of tuberculosis. (ii) Stony dulness at an apex, persisting for some weeks, and usually regarded as due to an unresolved apical pneumonia, often indicates a bronchial newgrowth, which is causing stenosis of the bronchus.

Modes of Onset.

Various classifications are to be found in the literature. The one in Table VII will serve as a basis for discussion. Important clues to diagnosis are to be found here. The largest group is that wherein the onset has been insidious, with some or all of the cardinal symptoms, extending over a period of some months. They number 38, and in nearly all diagnosis was made late in the course of the disease. Improvement in diagnostic methods should result in the future in a percentage of operable cases being found in a group such as this. In 19 cases pleural effusion led to the patients' admission to hospital. Pain and shortness of breath were the usual symptoms, a noteworthy point being that there was often only slight dyspnœa, though one side of the chest was full of fluid. If an effusion is found to reach the apex of the lung on first examination, the cause is usually newgrowth.

Table VII.

Mode of Onset or Presenting Symptoms in One Hundred Cases of Cancer of the Lung.

	Number of Cases.
Insidious respiratory	38
Evidence of pleural effusion	19
Acute onset—	
Lung abscess	2
Influenza	4
Feverish cold	4
Pneumonia	8
Evidence of intrathoracic pressure	8
Hæmoptysis	7
Chronic respiratory	2
Cerebral onset	4
Arthritis	2
Paraplegia	1
Hæmatemesis	1

No less than 18%, or practically one case in five, had an acute onset. Probably in many this was more apparent than real, as patients tend to forget earlier symptoms in the presence of an acute illness. The point is, however, that carcinoma of the lung often manifests itself only in the presence of a superadded infection, to which, owing to the resultant bronchostenosis, the lung is particularly prone. Nevertheless it need not be assumed that actual lobar pneumonia was present in eight cases. Lobar collapse can give similar signs, and this was probably the usual cause of the earlier diagnosis, as it often is in "unresolved pneumonia".

In eight cases the only symptoms were of intrathoracic pressure, and mediastinal tumour was the provisional diagnosis. In six of these the correct diagnosis was made only at autopsy; but a clear appreciation of the oat-celled tumour of Barnard should lead to fewer diagnostic errors in this group in the future. In many other cases, of course, signs of pressure on mediastinal contents developed at later stages.

Seven patients were admitted to hospital with the presenting symptom of hæmoptysis. In two it was so severe as to lead directly to the patient's death. Slight or recurrent hæmoptysis was noted in many of the insidious group. Only two patients offered a really long history of respiratory symptoms, though, as stated before, close questioning would have increased this number. One under my own observation had chronic bronchitis with asthmatic attacks for two years before any localizing signs presented themselves. The other gave a history of cough for nine years; but during the three months previous to diagnosis all the typical symptoms of bronchial carcinoma manifested themselves.

The remaining eight constitute the atypical group, illustrating onset with symptoms only of metastasis, and the type discovered accidentally *post mortem*. The appearance of obscure cerebral symptoms in middle age should lead to radiological examination of the patient's chest. In American neurological clinics a comparatively high percentage of suspected cerebral tumours is proven to be secondary to intrathoracic neoplasm. In some the chest is examined radiologically as a routine procedure.

Radiological Diagnosis.

Considering the period of time covered by the review, the percentage of cases with accurate X ray findings is not low (Table VIII). I have been lenient in accepting among the thirty-eight a number in which newgrowth was merely "suggested", and not strictly accurate in admitting some wherein the growth was stated to be mediastinal in origin.

Table VIII.

Radiological Evidence in One Hundred Cases of Carcinoma of the Lung.

X Ray Examination.	Number of Cases.
Definite diagnosis	38
Showing "opacity"	28
Doubtful	12
Diagnosis missed	6
Not done	16

Note.—A lipiodol bronchogram was obtained in eight cases.

In most of those twenty-eight cases showing radio-opacity the cause was fluid. Some radiologists tend, however, to give up after stating that "one side of the chest is radio-opaque", when they could be more helpful. For instance, the position of the heart and mediastinum is not always noted—an important guide to the diagnosis of atelectasis. Later, I hope to show films illustrating this point. In the doubt-

ful cases there are included those wherein two possible diagnoses were offered, hydatid being the most frequent alternative, thickened pleura and lung abscess receiving occasional mention.

Only in six was the diagnosis entirely missed. But, of course, the cases in the series were nearly all in a late stage.

In sixteen, for various reasons, X ray examination was not carried out. In five no real clue was given as to the possibility of any intrathoracic lesion.

Actually, these figures are biased in favour of the radiologist. In accepting the forty-five clinical cases I placed considerable reliance on the radiological findings and tended to exclude those cases in which they did not support the diagnosis of neoplasm. My figures have no direct bearing on the value of radiology in early diagnosis; but there is no question that the value is very great. In the future, particularly with the aid of contrast medium bronchography, radiological diagnosis should have an accuracy approaching 100%. Differential diagnosis has not been mentioned. It will be fully dealt with in the succeeding paper.

Lipiodol Bronchography.

Huguenin, in his classical monograph, "Primary Cancer of the Lung", states: "The intrabronchial injection of lipiodol is the diagnostic procedure which should take the place of prime importance in the radiological investigation of cancer of the lung." This statement has been endorsed by many subsequent writers; but it has not yet been fully appreciated, at least in this State. I should therefore like to discuss some cases of the series and to show you slides which illustrate, among other points, the diagnostic value of a contrast medium injected into the bronchial tree. Bronchial carcinoma usually leads to narrowing and later complete stenosis of the bronchus. Lipiodol demonstrates the exact site, and often the extent, of this obstruction.

Case I.—N.W., a male, aged thirty-six years, a tram-driver, was first seen on June 18, 1930. He complained of pain in the right side of the chest for six months, with shortness of breath, cough and occasional hæmoptysis. He was found to have an impaired percussion note over the base of the right lung, with weak breath sounds. The skiagram (see Figure II) revealed a large rounded tumour in the right lower lobe. Examination after the injection of lipiodol showed a complete block of a secondary bronchus (see Figure III). At this stage an interesting discovery was made, due to an X ray technician's recollection that an earlier radiogram of the patient's chest had been taken in January, 1929. The report was: "No abnormality". This skiagram (see Figure I) clearly shows, in retrospect, a bulge behind the right side of the heart, with a definite margin. It is the earliest radiological evidence of a pulmonary newgrowth of the hilar type that I have seen. The patient was further questioned and he then admitted to several attacks of pleurisy during the previous five years, one of which led to his abortive radiological examination. This case is a striking illustration of the latency of the disease. The subsequent history is also of interest. Despite deep X ray therapy, the growth steadily increased in size. Numerous nodules, obviously secondary lesions, appeared in the subcutaneous tissues; a surgeon, however, refused to remove one for biopsy, regarding them as thromboses. Before the patient's death at home, in May, 1931, following several large hæmoptyses, these skin nodules had grown to the size of large plums. Despite the absence of pathological proof, there can be no doubt as to the diagnosis in this case.

Case II.—H.C., a male, aged forty-nine years, a railway ganger, was first seen on June 1, 1935. He gave a characteristic history of the five cardinal symptoms, extending over fifteen months. In addition he had obvious clubbing of the fingers. The radiologist's report on a plain film (see Figure IV) was as follows: "There is an opacity at the right base, suggesting greatly thickened pleura with small effusion and pneumonia." One cannot help regretting how often radiologists ignore the clinical history, which in this case is hardly consistent with the report. The bronchograms (see Figures V and VI) clearly demonstrate a block of the right lower bronchus, with resultant collapse of the lower lobe. The patient had no sputum and was afebrile, and serological tests revealed no abnormality. Bronchoscopy was performed by Dr. Halloran, who reported as follows:

> In the right lower lobe bronchus an irregular granulated area was seen, suggestive of neoplasm. It was extremely vascular and hæmorrhage prevented the obtaining of a specimen for biopsy.

A surgeon saw the case in consultation, but regarded the condition as probably inflammatory or, if neoplastic, as too large to remove, assuming that the atelectasis was the growth. I would respectfully suggest that this was a case wherein thoracotomy was definitely indicated and lobectomy might have been possible.[1]

Case III.—The skiagrams (see Figures VII and VIII) are from a patient who was treated for pulmonary tuberculosis for twelve months. A plain skiagram (see Figure VII) showed encysted fluid (on aspiration this was chocolate coloured). The lipiodol bronchogram (see Figure VIII) shows a block of the left upper bronchus and, in addition, considerable erosion of the trachea. This latter finding would seem to place the diagnosis of carcinoma beyond doubt. The patient was too ill for bronchoscopy, and died at home two months after the skiagrams were taken.

Case IV.—This case illustrates again the value of lipiodol. The plain skiagram (see Figure IX) was reported on as follows: "The whole of the left side of the chest is radio-opaque, the lung structure being entirely concealed by effusion or intense pleural thickening. No suggestion as to the underlying cause of this can be given." The bronchogram (see Figure X) shows the characteristic blocked bronchus on the left side, all the lipiodol having passed into the right lung. Bronchoscopy was performed by Dr. Godsall. A fungating mass was found, completely blocking the left bronchus three centimetres below the bifurcation. A snipping was removed and the biopsy report was "bronchial carcinoma". Thoracotomy was carried out; but it was found that the mass was inoperable. I would suggest in this case that there was a failure of adequate diagnostic help on the part of the radiologist. Many do not even yet appreciate the value of lipiodol.

Case V.—The skiagrams (see Figures XI and XII) reveal collapse of the left lung from blockage of the left bronchus. The interesting feature of this case is that bronchoscopy showed a distortion of the bronchial tree, the left bronchus curving outwards. This led the bronchoscopist to diagnose some extrinsic pressure, such as would come from a mediastinal tumour. The autopsy revealed, however, bronchial carcinoma of the oat-cell type with widespread metastases. I have seen several such cases in which the bronchial distortion has prevented the bronchoscope from reaching the site of the lesion.

Case VI.—The skiagram (see Figure XIII), a lateral view, shows the blocking of a bronchus from a carcinoma (proven by biopsy) and clearly demonstrates an area of saccular bronchiectasis distal to the obstruction.

Case VII.—This case is not one of the series, but is included as it possesses many points of interest. Mrs. G.S., aged thirty-one years, was first seen in April, 1931, by Dr. Stobo and myself at the Royal North Shore Hospital.

[1] *Post mortem* examination in February, 1936, revealed a bronchial carcinoma in the right lower lobe.

Her history was that she had coughed blood on three occasions during the previous twelve months. She had no other symptom. It was noted that she was very pale, but weighed 70·5 kilograms (eleven stone one pound). An impaired percussion note and absence of breath sounds were noted at the right base, and X ray evidence suggested pleurisy in this area. A provisional diagnosis of bronchiectasis with the possibility of a newgrowth was given. During the next two and a half years she had frequent hæmoptyses, but gained 6·4 kilograms (one stone) in weight. No other symptoms appeared nor did her physical signs alter. In September, 1933, the radiologist reported that the right lobe of the liver was markedly elevated, (?) hydatid, (?) newgrowth (see Figure XIV). In view of the previous history this seemed unlikely, and to settle the matter Dr. Loewenthal performed a pneumoperitoneum, showing that the condition was above the diaphragm and almost certainly due to collapse of the right lower lobe (see Figure XV). Bronchoscopy was performed by Dr. Blashki, who found granulation tissue in the lower right bronchus. A biopsy was not obtained; but lipiodol was given, revealing blockage of the bronchus (see Figure XVI), and it was felt that the diagnosis of bronchial carcinoma was no longer in doubt.

In November, 1933, the patient developed pneumonia, which was followed by empyema, which was drained surgically. Good recovery was made. In January, February and March, 1934, the patient had repeated hæmoptyses. She was admitted to hospital. Her weight at this period was 70·5 kilograms (eleven stone one pound). Cardiac failure developed and she died soon after. *Post mortem* examination was performed, with the following findings:

Macroscopic Examination.—(i) Small residual empyema. (ii) Bronchiectasis of the right lung. (iii) Encapsulated tumour, seven centimetres by four centimetres, in the right lower lobe, below and internal to the main bronchus, and pressing on it.

Histological Examination.—Bronchial carcinoma of the squamous type. No metastases were present.

Points to note are as follows: (i) four years' practically monosymptomatic history; (ii) maintenance of weight and general condition; (iii) signs, simulating effusion, due to collapse of the right lower lobe from pressure of the neoplasm on the bronchus; (iv) the resulting bronchiectasis, pneumonia and empyema; (v) the aids to diagnosis by pneumoperitoneum and bronchogram; (vi) lobectomy might have cured this patient.

Conclusion.

These then are possible additional steps in diagnosis in a patient with persistent pulmonary symptoms or signs, where a definite diagnosis is lacking: (i) lipiodol bronchography, (ii) bronchoscopy, (iii) thoracotomy. If the first two reveal no evidence of tumour, and the symptoms point to tumour, exploratory thoracotomy should be carried out. In the hands of the skilled thoracic surgeon there should be no greater risk than in laparotomy.

This evening's meeting may be taken as marking the close of a period. Never again will papers be read on cancer of the lung by physician and radiologist alone. Perhaps the bronchoscopist and the surgeon will replace them as the principal speakers. A careful history and evalution of symptoms will remain of prime importance, and the lustre of radiology in diagnosis is not likely to grow dim. But at times bronchoscopy will replace radiology as the method of earliest diagnosis.

Radium and deep X ray therapy will have a place in treatment, probably only palliative, albeit X ray therapy is still in a stage of comparative immaturity. But, as in most other parts of the body, the only cure for a tumour is its removal by the surgeon's knife. In the hands of the thoracic surgeon lies such small hope as the future holds for the sufferer from bronchial carcinoma.

Summary.

1. A brief analysis has been made of one hundred cases of primary cancer of the lung (bronchial carcinoma) admitted to the Royal Prince Alfred Hospital during the twenty-five years 1910 to 1935.

2. The great increase of admissions in the later years has been noted.

3. The average duration of symptoms prior to admission and before death are given. It is probable that these periods are too short and that the malady is usually of several years' duration.

4. Occupational incidence is discussed, the figures suggesting that open air occupation and noxious inhalatory stimuli may play a part in ætiology.

5. Some pathological data are given and the frequency of metastasis and of pleural effusion is noted.

6. The rarity of bronchoscopic examination in the series is commented on.

7. The principal symptoms and signs are enumerated in order of frequency. A classification has been made of the various modes of onset.

8. Radiological diagnosis is discussed and the value is stressed of lipiodol bronchography.

9. Some illustrative case notes and skiagrams are given.

10. A plea is made for earlier diagnosis; for the adoption as a routine of bronchoscopy and thoracotomy in doubtful cases; for the diagnostic use in appropriate cases of artificial pneumothorax and gas replacement, and for the careful consideration in every case of a possible cure by a radical surgical procedure, such as lobectomy or pneumectomy.

Acknowledgements.

I am indebted to my colleagues at the Royal Prince Alfred Hospital for the use of the clinical records of their patients, and to the pathologists for access to the *post mortem* reports; also to Mr. David Farrell, of the University of Sydney, for drawing the graphs.

Bibliography.

C. I. Allen: "Primary Carcinoma of the Lung", *Surgery, Gynecology and Obstetrics*, Volume LV, August, 1932, page 151.

Charles Bowesman: "Primary Carcinoma of the Lung", *The Irish Journal of Medical Sciences*, Number 98 (sixth series), February, 1934, page 49.

W. Brockbank: "The Occupational Incidence of Primary Lung Cancer", *The Quarterly Journal of Medicine*, Volume I, new series, 1932, page 31.

L. S. T. Burrell: "Early Diagnosis of Malignant Disease of the Mediastinum, Lung and Pleura", *The Practitioner*, Volume CXXX, February, 1933, page 157.

F. G. Chandler: "Cancer of the Lung: Its Modes of Behaviour", *The British Medical Journal*, June 29, 1935, page 1310.

S. O. Cowen: "The Diagnosis of Primary Carcinoma of the Lung", *The Melbourne Hospital Clinical Reports* Volume IV, Number 1, June, 1933, page 23.

Maurice Davidson: "Cancer of the Lung and Other Intra-Thoracic Tumours", 1930.

A. Tudor Edwards: "Malignant Disease of the Lung", *The British Medical Journal*, January 24, 1931, page 129.

A. Tudor Edwards: "Malignant Disease of the Lung", *The Journal of Thoracic Surgery*, Volume IV, Number 2, December, 1934, page 107.
B. M. Fried: "Primary Carcinoma of the Lung", *Medicine*, Volume X, 1931, page 373.
Hadfield and Garrod: "Recent Advances in Pathology", 1932.
Eric Gutteridge: "Primary Carcinoma of the Lung: Report of 36 Cases from the Melbourne Hospital Records 1922-1932", *The Melbourne Hospital Clinical Reports*, Volume IV, Number 1, June, 1933, page 16.
R. M. Hill: "Primary Carcinoma of the Lung: Its Incidence and Pathology", *The Edinburgh Medical Journal*, Volume XLI, Number 5, May, 1934, page 320.
Rene Huguenin: *"Cancer primitif du poumon"*, 1928.
Donald S. King: "Benign and Malignant Tumours of the Lung, Bronchi and Mediastinum", *The New England Journal of Medicine*, Volume CCIX, Number 6, August 10, 1933, page 282.
J. Maxwell and W. W. Nicholson: "A Clinical Study of Bronchial Carcinoma", *The Quarterly Journal of Medicine*, Volume XXIII, Number 29, 1930, page 29.
H. V. Morlock and A. J. Scott Pinchin: "Primary Intrathoracic Newgrowth: Observations on 50 Cases Examined Bronchoscopically", *The British Medical Journal*, May 27, 1933, page 911.
W. L. Rogers: "Primary Cancer of the Lung", *Archives of Internal Medicine*, Volume XLIX, 1932, page 1058.
T. Shennan: "Tumours of Mediastinum and Lung", *The Journal of Pathology and Bacteriology*, Volume XXXI, Number 2, 1928, page 365.
S. Levy Simpson: "Primary Carcinoma of the Lung", *The Quarterly Journal of Medicine*, Volume XXII, April, 1929, page 413.
M. P. Susman: "Diagnosis and Treatment of Primary Carcinoma of the Bronchus", *The Journal of the Cancer Research Committee*, February 1, 1935, page 148.

INFARCTS AND THROMBOSES MET WITH IN 3,000 AUTOPSIES.

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In a paper entitled "Thrombosis and Embolism" S. R. Rosenthal, of Chicago,[1] has discussed the incidence of these conditions in 1,000 consecutive autopsies. The Medical Journal of Australia, January 24, 1931, page 117, makes a short reference to Rosenthal's paper. In the 1,000 *post mortem* examinations, 134 cases of thrombosis, 76 cases of embolism and 2 cases of fatal lung embolism were met with. The author, in the study of his material, came to the conclusion that, though the factors of stasis and endothelial injury were important, they were ineffectual in causing thrombosis unless changes in the blood had first taken place.

Dr. Rosenthal's paper and the note thereon in this journal have led me to review the material which has now been accumulated at the Adelaide Hospital as the result of tabulating our findings in *post mortem* examinations. Three thousand cases have now been dealt with; the results of the first 2,000 have been published in *The Medical and Scientific Archives of the Adelaide Hospital*; the third series is now appearing, though not yet complete. In these series special headings have been provided for "Infarcts", "Thromboses" (as in large veins), "Massive Pulmonary Embolism" and "Thrombi in the Heart". Cerebral softening is not placed under the infarcts, but independently under the "Central Nervous System". The method of arrangement of our data is not quite the same as that furnished by Dr. Rosenthal. On examination of our series, I also find that a smaller percentage of infarcts and thromboses is recorded in the first thousand cases, which is probably due to increasing care in making the later examinations. In Table I the figures for the three thousand consecutive cases are given separately; whilst the figures for important lesions, such as massive pulmonary embolism and infarction of the heart wall, are essentially correct, the figures for infarcts, for thromboses in large vessels, and for *ante mortem* thrombi in the chambers of the heart are probably somewhat low, having been possibly unrecorded in some of the earlier autopsies.

Table I.
Infarcts and Large Thromboses in 3,000 Autopsies.

Condition.	Number in the Three Series.	Total.	Percentage.
Infarcts (including nine infarct-like pyæmic foci in lungs) ..	53+77+79	209	7·0
Massive pulmonary embolism ..	15+9+17	41	1·4
Thromboses in large vessels ..	15+31+32	78	2·6
Thrombi in the chambers of the heart	12+31+21	64	2·1
Infarctions of the heart wall ..	13+6+14	33	1·1

Ophüls,[2] in 3,000 Californian autopsies, records only 10 examples of massive pulmonary embolism. His data are not tabulated in quite the same way as ours, but apparently the examples of infarction of the heart wall, recent or old, come to 35 and ours to 33.

Infarcts of the Lung.

In the course of 3,000 *post mortem* examinations at the Adelaide Hospital between the years 1920 and 1935, inclusive; 119 examples of old or recent infarctions in the lungs have been met with out of a total number of cases of infarcts of 209. In nine of these cases the infarcts of the lungs were pyæmic or infective in nature, three of these cases being puerperal. These cases will be discussed later. In one case there were a number of minute infarctions scattered through the lung tissue, the patient having suffered from hydatidiform mole; little masses of syncytium were found blocking the lung capillaries; this case has been already reported. This leaves a total of 109 ordinary examples of infarcts in the lungs in 3,000 *post mortem* examinations.

In 33 of the 109 cases infarcts in the lungs were associated with infarcts in other organs as well, as shown in Table II.

Table II.

Situation.	Number of Cases.
Lungs and kidneys	14
Lungs, kidneys and heart	3
Lungs, kidneys and spleen	3
Lungs, kidneys and brain	1
Lungs, kidneys, spleen and liver	1
Lungs, kidneys, spleen and brain	2
Lungs and spleen	4
Lungs, spleen and brain	1
Lungs and heart	3
Lungs and suprarenal	1

It thus appears that in approximately 30% of patients with infarcts in the lungs there are infarcts

in other organs as well. This is of particular interest, inasmuch as the sources of the infarcts in the lungs must be looked for in the right side of the heart or in the systemic veins or in the lungs themselves, whereas in the case of the other organs the source of the emboli must be almost always the left side of the heart. It thus appears that in about 30% at least of cases there are factors operating to produce infarction on both of these sides of the circulation (see Table III).

Table III.

Showing the Lesions Associated with Infarcts of the Lung.

Situation.	Number of Cases.	
With valvular disease of the heart:		
With mitral stenosis only	12	30
With calcified aortic and mitral valves	1	
With mitral and aortic disease	1	
With aortic disease	2	
With mitral regurgitation	1	
With malignant endocarditis (usually grafted on rheumatic fibrosis)	13	
With hypertrophied and dilated hearts not due to valvular disease:		
Hypertrophied and dilated hearts from hyperpiesis	25	36
With renal fibrosis	6	
With exophthalmic goitre	1	
With syphilitic aortic disease	2	
With syphilitic aortitis	1	
With aneurysm	1	
From detachment of clots from large systemic veins	12	
In typhoid fever	2	
Miscellaneous cases	28	

The table shows that the most common cause of infarcts in the lungs is a hypertrophied and dilated heart due to causes other than valvular disease, two-thirds of such cases being met with in those hypertrophied and dilated hearts which are the result of hyperpiesis unaccompanied by renal disease.

In the infarcts met with in valvular disease of the heart the majority of cases are almost equally divided between simple mitral stenosis and malignant endocarditis. The association of infarcts of the lung with mitral stenosis has always been well recognized, and the factors giving rise to the infarcts in these cases are evidently the same as those operating in hypertrophied and dilated hearts from other causes.

In the case of malignant endocarditis, two factors may be operating, one being the usual underlying rheumatic fibrosis and the other being the superadded vegetations which may become readily detached. If, however, these vegetations were responsible for the infarction, then we should find that the site of their attachment was on the right side of the heart in all cases. This was not, however, the case, as in only 3 of the 13 were vegetations found on the tricuspid valve or the right side of the heart. It would therefore seem that we can group together most of the cases of malignant endocarditis with the examples of mitral stenosis, attributing the infarcts in the lungs to the dilated chambers that result from the valvular defect.

The next most common cause of infarcts in the lungs is the detachment of portion of a clot from one of the large systemic veins. This occurred in 12 out of the 109 cases.

In considering the causes that may lead to the occurrence of infarcts in the lungs, these may be relegated into three categories: (i) the thrombus responsible for the infarct may be dislodged from one of the great veins, (ii) it may be detached from *ante mortem* thrombi in the dilated chambers of the right side of the heart, (iii) it may be due to local conditions in the lung itself.

It will be seen that approximately one-ninth of the examples of infarcts in the lung are clearly due to the detachment of thrombi from the systemic veins. Thromboses in these great veins in many cases have followed abdominal operations after an interval of over a week.

As regards the second category, that is, the detachment of clots from the dilated chambers of the right side of the heart, we have 36 cases in which there were hypertrophied and dilated hearts not due to valvular disease. In another 30 cases there was valvular disease with back pressure and more or less hypertrophy and dilatation of the right side of the heart. I pointed out, in considering malignant endocarditis, that the infarcts in most of these cases were to be attributed to the primary cardiac condition preceding the malignant endocarditis, rather than to the detachment of vegetations from the valves. There are thus 66 cases in which the condition of the heart may explain the occurrence of the infarction, the majority of these cases having dilated right auricles. In these dilated auricles the blood current tends to become slowed and there is the well known tendency for *ante mortem* clots to form as the result of the deposition of platelets. Though in only 14 of the 66 were clots actually detected at the *post mortem* examination, it is quite possible that in many of the remaining cases a small clot had been present from time to time which had been dislodged, giving rise to the infarction.

As regards the third category, that of lesions in the lungs themselves, these may be either thromboses in the pulmonary vessels or a localized engorgement of such a kind as to lead to the escape of red cells from the distended capillaries in the alveolar walls. The latter condition we see particularly in the lesions due to the localization of *Staphylococcus aureus* in the lungs. These will be discussed later. It is possible that some of those examples of dilated hearts in which clots were not found in the auricular appendix were due purely to the effects of the back pressure in the lungs leading to intense engorgement and the massed escape of red cells into the alveoli. Or it may be that the relative stagnation of the circulation predisposes to thromboses in small branches of the pulmonary vessels. Though these may explain some cases, we would attribute the majority to the detachment of thrombi from the recesses of the right auricle, even though at the *post mortem* examination thrombi may no longer be present there.

The occurrence of infarcts in the lung in typhoid fever is of particular interest. Of the 3,000 *post mortem* examinations, only 20 were made in cases of typhoid fever, and yet we found that two showed pulmonary infarcts; one patient died from massive pulmonary embolism, and a fourth showed an infarct in the spleen.

Miscellaneous lesions were associated with infarcts in the lung in 28 cases. The cases are very varied and do not seem classifiable in any way. The following are some of the more interesting examples.

Infarcts of the lungs were found: with tuberculous pleurisy in a woman of fifty-three; in a woman of forty-eight, convalescing from measles, who had an irregular pneumonia with what appeared to be old infarcts and also had hæmorrhagic infarction of the suprarenals; in a man of seventy with bronchopneumonia; in males of nineteen, fifty-five and sixty-five with pleurisy and (usually) pneumonia; in a man of twenty-three with an organizing pneumonia and abscesses; in a man of sixty-nine with lymphatic leuchæmia and bronchopneumonia; in a woman of sixty-six and a man of fifty-four with carcinoma of the stomach; in a woman of sixty-three with carcinoma of the pancreas; in a girl of eighteen with hydatidiform mole; in a man of fifty-three with amœbic dysentery and abscess of the liver; in a lad of twenty-one with *purpura hæmorrhagica*; in a man of sixty-three with a strangulated Richter's hernia; in a man of sixty-five who had been operated on for inguinal hernia and died nine days later from cardiac failure, the circumstances suggesting that clots had been present in one of the large veins; in a woman of forty-eight who had locomotor ataxia, cystitis and pyelitis and who gave a Weil-Felix reaction; in a man of seventy-four with a growth or gumma in the left crus, and atheromatous cerebral vessels and a chronic gastric ulcer; and in a woman of sixty with *Staphylococcus aureus* infection of the nose and face with extension to the cavernous sinus, there being a small old infarct of the lung evidently antedating the recent acute infection.

There were nine cases in which there were pyæmic "infarcts" in the lungs. I should like to call special attention to these infarcts, which are due to *Staphylococcus aureus*. In many of these cases the infarcts in the lungs are large and resemble closely ordinary infarcts, being dark red, raised above the surface, and often wedge-shaped. They differ, however, from ordinary simple infarcts in having a small central white necrotic area and also in occasionally showing, when they project from the surface of the lung, a little eroded-looking area on the height of their convexity, suggesting the commencement of a small ulcer. This appearance was very pronounced in patients during the epidemic of influenza in 1919, when a *Staphylococcus aureus* infection was present in the lung as a complication. The large size of these infarcts suggests that they are more than the result of the plugging of a small vessel by a small mass of cocci. A *Staphylococcus aureus* infection gives rise, as we know, in the skin and in the kidneys to intense engorgement around it. The same undoubtedly occurs in the lungs when groups of this organism are caught in its capillaries. An intense engorgement results and the infarct is probably due to the escape of red cells from the intensely engorged capillaries of the surrounding alveoli into the alveolar spaces themselves, eventually filling them with red cells. This escape of red cells is perhaps more a diapedesis than an actual rhexis. At any rate in these infarct-like areas we find the alveoli are closely packed with red cells and are not filled with a mixture of red cells and fibrin, as might be expected if there had been an ordinary hæmorrhage.

Massive pulmonary embolism has not been included in the above series of infarcts in the lung unless there happened to be associated ordinary wedge-shaped red infarcts. Altogether there were 41 examples of massive pulmonary embolism in the 3,000 *post mortem* examinations, giving a percentage of about 1·4. In ten of these there were ordinary infarcts in the lung, showing that small portions of the clot had been previously detached and had lodged in the lung.

Ophüls states that the formation of hæmorrhagic infarcts in the lungs in chronic heart disease was such a common condition in his series that no special count was kept of it. Acutely fatal embolism of the trunk of the pulmonary artery occurred in 10 cases, compared with our 41.

A considerably blood-stained pleuritic effusion was specially recorded in two cases in which infarcts of the lung had occurred in subjects with hypertrophied and dilated hearts, presumably due to high tension.

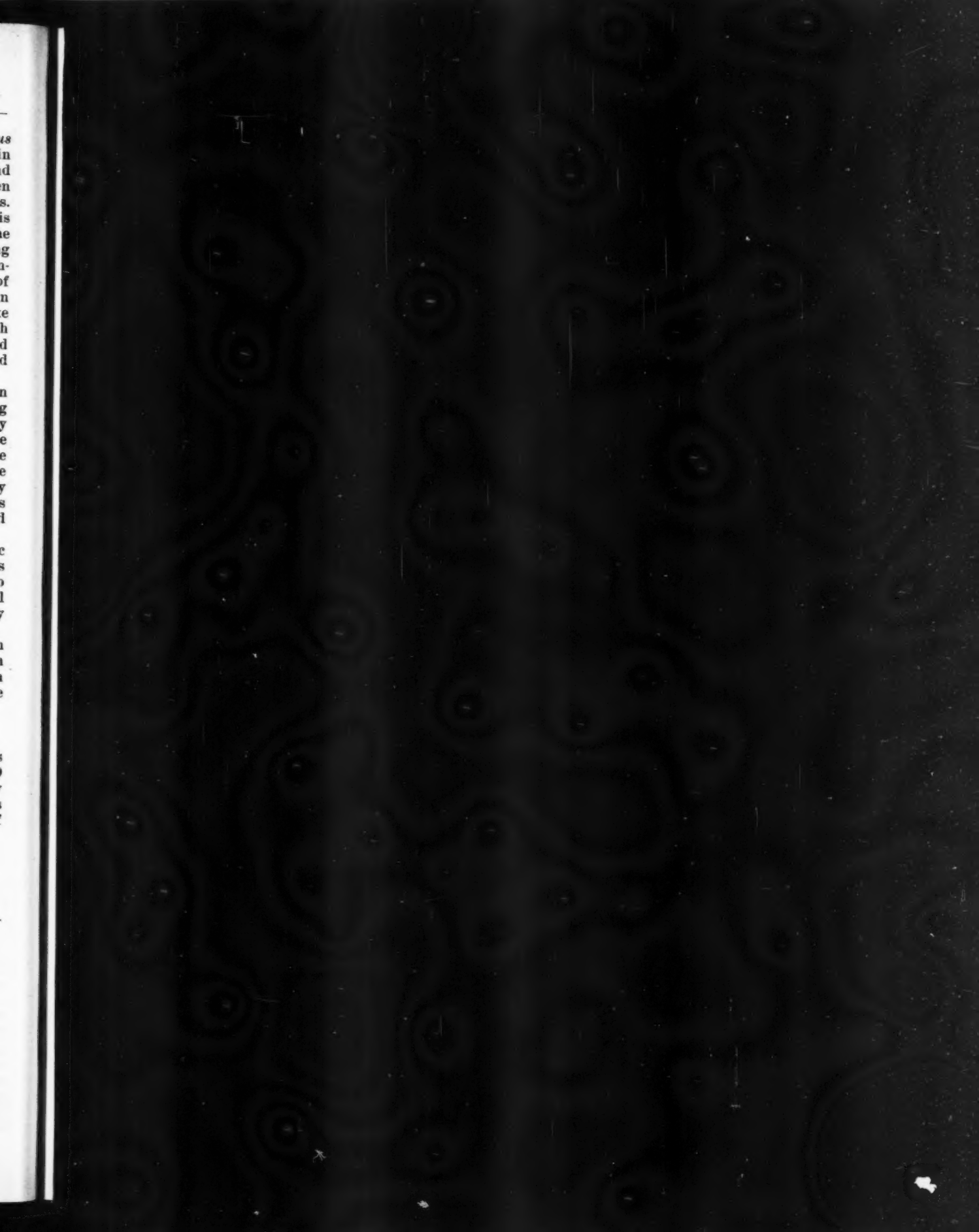
Infarcts of the Kidneys.

In the 3,000 *post mortem* examinations, infarcts of the kidneys were met with in 64 cases out of 209 in which infarcts were noticed. Thus in nearly one-third of the examples of infarction the kidneys were affected. Table IV shows the other organs, if any, which also showed the presence of infarcts.

Table IV.

Organ.	Number of Cases.
Kidney only	21
Kidney + spleen	13
Kidney + spleen + liver + lungs	1
Kidney + spleen + brain	4
Kidney + spleen + brain + lungs	2
Kidney + spleen + brain + jejunum	1
Kidney + spleen + brain + foot	1
Kidney + spleen + infective aneurysm in brain + infective aneurysm of abdominal aorta	1
Kidney + spleen + lung	3
Kidney + spleen + apex of left ventricle	1
Kidney + lung	14
Kidney + lung + brain	1
Kidney + brain	1

Table IV shows that in two-thirds of the cases in which infarcts of the kidney were present, infarcts occurred in other situations as well.



ILLUSTRATIONS TO THE ARTICLE BY DR. COTTER HARVEY.

FIGURE I.
Bronchial carcinoma, hilar type, at a very early stage (Case I).

FIGURE II.
The same as in Figure I, seventeen months later; the diagnosis is now obvious.

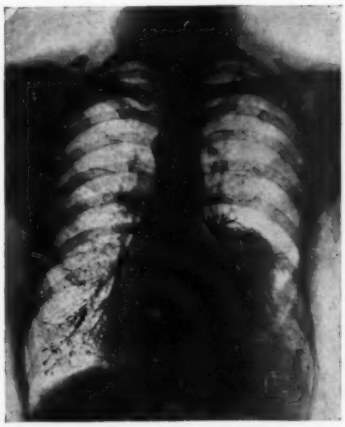


FIGURE III.
The same as in Figure II. Lipiodol bronchogram, showing blockage of a secondary bronchus. In the preparation of this illustration the skiagram has been transposed.

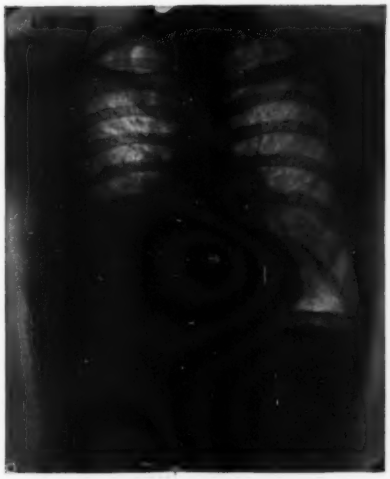


FIGURE IV.
Plain skiagram of the patient's chest in Case II.

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FIGURE V.
The same as in Figure IV. Bronchogram showing blocked bronchus and atelectasis.

FIGURE VI.
The same as in Figure V, lateral view. The collapsed lower lobe is well shown.

FIGURE VII.
Plain skiagram of the patient's chest in Case III.

FIGURE VIII.
The same as in Figure VII. Bronchogram showing blockage of the left upper bronchus and erosion of the trachea. In the preparation of this illustration the skiagram has been transposed.

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FIGURE IX.
A plain skiagram showing left-sided radio-opacity (Case IV).

FIGURE X.
The same as in Figure IX. Bronchogram showing complete blockage of the left main bronchus. In the preparation of this illustration the skiagram has been transposed.

FIGURE XI.
A plain skiagram, showing collapse of the greater part of the left lung (Case V).

FIGURE XII.
The same as in Figure XI. Bronchogram, with blockage of the left bronchus. Note distortion of the bronchial stump. In the preparation of this illustration the skiagram has been transposed.

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FIGURE XIII.

A lateral bronchogram, showing bronchostenosis and resultant bronchiectasis (Case VI).

FIGURE XIV.

A plain skiagram, showing a mass in the region of the right leaf of the diaphragm (Case VII). In the preparation of this illustration the skiagram has been transposed.

FIGURE XV.

The same as in Figure XIV. Pneumoperitoneum, showing that the mass is above the diaphragm. In the preparation of this illustration the skiagram has been transposed.

FIGURE XVI.

The same as in Figures XIV and XV. Bronchogram, showing blockage of the right lower bronchus and demonstrating finally that the "mass" is the collapsed right lower lobe. In the preparation of this illustration the skiagram has been transposed.

In 27 of the 64 cases infarcts were present in the spleen, that is, in nearly half of the entire series of kidney cases. In 20 cases, or about one-third, infarcts also occurred in the lungs; and in 10 cases, or about one-sixth, in the brain.

As regards the causes of the infarcts, Table V shows the associated conditions.

Table V.

Condition.	Number of Cases.
Malignant endocarditis	29
Mitral stenosis	5
Calcified aortic and mitral valves	3
Hypertrophied and dilated hearts attributed to hyperpiesis	10
Hypertrophied heart and chronic interstitial nephritis	1
Aneurysm of the aorta	2
Chronic interstitial nephritis	1
Various lesions	13

In malignant endocarditis, where vegetations frequently occur on the left side of the heart, the explanation of the occurrence of the infarcts is obvious. Eight out of the 64 cases were associated with valvular disease of the heart, the mitral valve being affected in each instance. In these, hypertrophy and dilatation of the right side of the heart with chronic venous congestion were present. There were 13 cases in which the heart was hypertrophied and dilated from hyperpiesis, aneurysm *et cetera*. These 13 cases with the eight valvular cases give a total of 21, or practically one-third of the total cases showing infarcts, in which dilatation of the chambers of the heart occurred. The valvular lesions were so situated that the left auricle was dilated and in the recesses of its appendix *ante mortem* clots could form and from this site might escape from time to time.

Infarction of the kidneys can also result from the detachment of clots attached to the wall of the left ventricle, especially following coronary infarction. The records show that *ante mortem* clots were present in the left auricle in four cases, in both auricles in two cases, in the right auricle in two cases, and on the wall of the left ventricle in six cases.

In Ophüls's 3,000 autopsies there were 46 cases of infarcts in the kidneys, compared with our 64, and 39 of these were due to malignant endocarditis, compared with our 29.

Infarcts of the Spleen.

In the 3,000 *post mortem* examinations infarcts of the spleen were met with in 56 cases out of 209 in which infarcts were recorded. Table VI shows what other organs, if any, also suffered from infarcts.

Table VI shows that in more than half the cases infarcts of the spleen were accompanied by infarcts in other organs. The most common association is for infarcts to occur in the spleen and the kidney.

As regards the causes for the infarction, distinction can be drawn between those cases showing infarcts in the spleen only and those showing infarcts in other organs as well. In only 5 of the 26 cases in which infarcts occurred only in the spleen was the associated condition malignant endocarditis; but in 21 of the 30 cases in which there were infarcts in the spleen and also in some other organ or organs malignant endocarditis was present.

Table VI.

Organ.	Number of Cases.
Spleen only	26
Spleen + lung	4
Spleen + lung + kidney	3
Spleen + lung + brain	1
Spleen + lung + kidney + brain	3
Spleen + lung + kidney + liver	1
Spleen + kidney	11
Spleen + kidney + brain	2
Spleen + kidney + brain + right foot	1
Spleen + kidney + brain + jejunum	1
Spleen + embolus in middle cerebral artery	1
Spleen + ileum	1
Spleen + embolus in femoral artery	1
Total	56

The associated conditions in infarcts of the spleen only were as follows in 26 cases: malignant endocarditis, 5; malignant growths of various organs, including one melanoma, 7; and one each of the following: severe anæmia, atypical Hodgkin's disease or leuchæmia, subphrenic abscess and empyema and large spleen, organized pneumonia and bronchopneumonia, hæmosiderosis, irregular cirrhosis of the liver, diabetes and gangrene of the foot, infection following abortion, pyonephrosis and cystitis, hæmorrhagic cystitis, mitral stenosis, coronary disease and infarction, dissecting aneurysm, and mesenteric thrombosis with extension to the splenic vein. In the last-named total infarction of the spleen resulted.

In the 30 cases in which there were infarcts in the spleen and some other organs, malignant endocarditis was responsible for 21; mitral stenosis for four; hypertrophy and dilatation of the heart, 1; hypertrophy and dilatation of the heart with thrombi in the left ventricle, 1; coronary disease, 1; cerebral abscess, 1; and *polycythæmia vera* with clot in the right external iliac vein, 1.

It will be seen from the above that when infarcts occur in the spleen and some other organ, in the majority of cases malignant endocarditis is present. But if the infarcts are confined to the spleen, malignant endocarditis, although still the most prevalent cause, is responsible for only about one-fifth of the infarcts. In quite a number of the unrelated diseases, in which malignant growths are the most common, conditions are present which lead to the occurrence of infarcts in the spleen, quite independent of the detachment of vegetations from the valves, and not necessarily associated with hypertrophy and dilatation of the heart and the possible occurrence of *ante mortem* thrombi in the chambers of the heart.

Ophüls, in his 3,000 *post mortem* examinations, found infarcts in the spleen in 37 cases, compared with our 56. In 32 of his cases endocarditis was present, and in 3 arteriosclerosis of the splenic arteries.

Infarcts of the Liver.

There were two cases in which infarcts of the liver were recorded, one being in a woman of thirty-seven, who developed *Staphylococcus aureus* pyæmia after an operation for repair of the cervix and who showed portal pyæmia with abscesses and infarcts. The other was the case of a male, aged thirty-two, with malignant endocarditis of the mitral valve and infarcts of the lungs, kidney and spleen as well.

Infarcts of the Small Intestines.

Mesenteric thrombosis is not included in these cases. There were three examples of embolic infarcts in the small bowel, in one case associated with infarcts in the spleen and in another with infarcts in the spleen, liver and brain. The third case was in a male of fifty-eight, who had a hypertrophied heart with atheromatous coronary vessels and an *ante mortem* clot on the endocardium.

Infarcts of the Suprarenals.

Two cases showed infarcts in the suprarenals: a woman of forty-eight, with an irregular pneumonia and old infarcts in the lung following on measles, showed hæmorrhagic infarction of both suprarenals; a woman of forty-two, with tuberculous salpingitis, tuberculosis of the lungs and tuberculous ulcers in the intestines, showed infarction of the left suprarenal. A case, rapidly fatal, of massive bilateral hæmorrhages in the suprarenals occurred shortly after the conclusion of the 3,000 autopsies.

Infarcts of the Testes.

A male of twenty-nine, with a hypertrophied and dilated heart from mitral stenosis and an adherent pericardium with red granular kidneys, had old and recent infarcts in the testes.

Summary.

1. In the 3,000 *post mortem* examinations at the Adelaide Hospital infarcts were met with in various organs in 209, or 7%. There were 119 examples of infarcts in the lungs, 64 of infarcts in the kidneys, 56 of infarcts in the spleen, 2 of infarcts in the suprarenals, 2 of infarcts in the liver, 3 of infarcts in the small intestines, and 1 of infarcts in both testes. Massive pulmonary embolism occurred in 41 (1·4%), thromboses in large vessels in 78 (2·6%), *ante mortem* thrombi in the chambers of the heart in 64 (2·1%), and infarcts of the heart wall in 33 (1·1%).

2. In 33 of 109 cases in which infarcts in the lung were present there were infarcts in other organs as well, the majority of these being in the kidneys (in 24 cases). Infarcts in the lung were associated with valvular disease of the heart in 30 cases, with hypertrophied and dilated hearts not due to valvular disease in 36, and were due to a detachment of clots from large systemic veins in 12. In typhoid fever there were two examples of infarcts in the lungs.

3. The infarct-like hæmorrhagic areas in *Staphylococcus aureus* infections of the lung are described.

4. Infarcts of the kidneys were associated in two-thirds of the cases with infarcts elsewhere. In 27 of the 64 cases there were infarcts of the spleen. Malignant endocarditis was responsible in 29 of the 64 cases.

5. In half the cases in which infarcts of the spleen were present there were infarcts in other organs. When there were infarcts elsewhere malignant endocarditis was the usual source of the emboli. When there were infarcts in the spleen only, malignant endocarditis was responsible for only about one-fifth of the infarcts.

6. Bilateral infarcts of the testes were recorded in a male of twenty-nine, with a hypertrophied and dilated heart from mitral stenosis and an adherent pericardium with red granular kidneys.

References.

(1) S. R. Rosenthal: "Thrombosis and Embolism: Analysis of 1,000 Autopsies", *Journal of Laboratory and Clinical Medicine*, Volume XVI, November, 1930, pages 107-118.
(2) William Ophüls: "A Statistical Survey of 3,000 Autopsies", "Stanford University Publications", "Medical Sciences", Volume I, Number 3, 1926.

Reports of Cases.

A CASE OF ACUTE BENIGN LYMPHOCYTIC MENINGITIS.

By John A. McLean, M.D. (Melbourne), M.R.C.P. (London),
Clinical Assistant, The Alfred Hospital, Melbourne.

Cases of recovery from a form of meningitis resembling tuberculous meningitis are not uncommon. Collis,(1) in a survey of the literature during the last twenty years, found that a number of cases with a similar syndrome have been reported under various titles. The most common title was acute aseptic meningitis, which Collis takes exception to on the ground that the condition is possibly a virus infection. He prefers the term acute benign lymphocytic meningitis, which is certainly descriptive of the condition and leaves the question of ætiology an open one.

Clinical History.

A boy, aged three years, was admitted into the West Middlesex Hospital, Isleworth, England, on August 11, 1935. He had been ill for three days and was fretful, apparently suffering from a headache, and he refused food. There had been no vomiting. The previous history showed that he had had measles nine months previously, mumps twelve months prior to admission into hospital, and diphtheria twenty-one months previously. The mother was said to be suffering from pulmonary tuberculosis in an active form, and a grandmother had died from pulmonary tuberculosis. On examination the child was lethargic and appeared to be very ill. The temperature was 40° C. (104° F.), respirations numbered 34, and the pulse rate was 144 in the minute. There was a general increase in muscular tone, neck stiffness was present and Kernig's sign was positive. The throat was clear, and examination of the ears, lungs, heart and abdomen revealed no abnormality. The optic fundi were normal. A lumbar puncture was performed; the cerebro-spinal fluid was

clear and under increased pressure. Examination of the cerebro-spinal fluid showed a cell count of 50 lymphocytes per cubic millimetre; protein, 0·04%; globulin, very slight increase; chlorides, 0·67 gramme per 100 cubic centimetres. The Wassermann test gave no reaction. No tubercle bacilli were found.

The child remained extremely ill for four days and the temperature was sustained at 39·4° C. (103° F.). The fever subsided by lysis and on the sixth day after admission to hospital the temperature was normal and the condition of the child was much improved. Several lumbar punctures and one cisternal puncture were performed, and on each occasion a careful search for tubercle bacilli was made with negative result. Eleven days after admission the right ear commenced to discharge and there was a recurrence of fever for three days. Subsequently the discharge became less and he made a complete recovery.

Comment.

The original diagnosis of tuberculous meningitis was discounted by the failure to find tubercle bacilli in the cerebro-spinal fluid and by the complete recovery of the patient. The occurrence of otorrhœa suggested that the meningitis was an associated condition, but the interval of five days after the initial meningitic phase of the illness was completed was against this hypothesis.

The cause of this type of meningitis is unknown. Collis[1] thinks that it is due to an unknown virus. Greenfield[2] states that "the term benign lymphocytic meningitis probably covers a number of conditions, some of which at least are mild virus infections of the nervous system".

In the case here reported, during the acute phases of the disease it was presumed that the diagnosis was tuberculous meningitis, and the opportunity of investigation by animal experiment was lost. It is hoped that in future if the opportunity occurs, an attempt to demonstrate a virus by cerebral inoculation of rabbits and by the cultural method on egg membrane will be made.

Acknowledgement.

I am indebted to Dr. J. B. Cook, Medical Superintendent of the West Middlesex County Hospital, for permission to report this case.

References.

[1] W. R. F. Collis: "Acute Benign Lymphocytic Meningitis", *The British Medical Journal*, December 14, 1935, page 1148.
[2] J. S. Greenfield: "Lumbar Puncture in Diagnosis", *The British Medical Journal*, December 28, 1935, page 1265.

Reviews.

SPA TREATMENT AT ROYAT.

ARTICLES and books dealing with the indications and results of spa treatment are always very vulnerable prey for any critical physician or physiologist. For a small volume eulogizing the virtues of the Royat waters, Dr. P. Deschamps, who now practises at this centre, describes the physical and chemical constitution of the springs and gives his experiences of their clinical value in disorders of the cardio-vascular system.[1] Vaquez has written a favourable foreword, commending both the treatment and the author.

Dr. Evan Bedford has prefaced the English translation and emphasizes the value of spa treatment in general and the ignorance of medical hydrology in England, a defect still greater in this country. The largest spring at Royat, called the Eugenie or Grand Source, alone provides no less than 360,000 gallons in twenty-four hours. The springs are one of a series forming the thermal basin of Auvergne. The temperature at the pipes is 96° F., and the free carbonic acid is 0·377 gramme per 1,000. During storage before the water enters the baths, unstable alkaline carbonates are formed, which on contact with the skin produce free carbon dioxide. The "A" bath, containing few bubbles, is stated to be sedative or hypotensor. The "B" bath is rich in bubbles and is alleged to be more cardiotonic than hypotensor. The physical properties of the waters compare favourably with those of other carbon dioxide springs, such as Spa in Belgium and the Bad Näuheim in Germany. The physiological effects of bathing are described as follows: superficial vasodilatation, lowering of the arterial pressure and of the oscillometric index (a popular Continental criterion), diminution in the pulse rate, reduction in cardiac diameters, diuresis and improvement in nitrogen excretion. These results are apparently considered by the French school as dependent upon a direct absorption of carbon dioxide through the skin into the blood stream and its storage in the tissues. As the immersion lasts only some ten to fifteen minutes, this is a procedure which English physiologists will view with scepticism. The effect of carbon dioxide on the skin itself is not entirely due to bubble formation; there is said to be also a definite chemical factor in operation, producing capillary dilatation. Experiments showing an increase in respiratory capacity, whatever that means, and in the respiratory quotient are quoted as indicating transcutaneous absorption. The possibility of inhalation of carbon dioxide from the surface of the bath is not considered. Work from many reliable sources vindicates the value of an increase in circulating carbon dioxide as a cardiac and vasomotor stimulant. Deschamps solemnly assures his readers that the carbon dioxide bath is a sedative for both vagal and sympathetic excitability, and that even glycosuria disappears under its miraculous influence.

The same breadth of view is maintained in the second section of the work, which deals with the therapeutic indications and results of Royat carbon dioxide thermal treatment. Hypertension, of all the types, plethoric, nervous, endocrine, constitutional, into which the French divide it, is benefited most of all. The plethorics (Volhard's "red" hypertensives) come off best, especially when placed on reduction diets with few stimulating foods. The nervous angiospastic hypertensive does well when he is forbidden gambling games, competitions, golf and "a life full of physical activity, intellectual fatigue and moral anxiety", as Deschamps's translator puts it. Since equally good results are the everyday experience of physicians pursuing this correlative treatment, it is difficult to ascribe all the happy endings to bubbles of carbon dioxide. Anyone, however, who has seen the elaborate ritual of a Continental spa, with its periods of enforced rest, its stringent dietary, its disciplined routine and its batteries of chromium-plated hydrotherapeutic machinery, must realize the powerful psychological impetus towards recovery so provided. This is more potent therapy in hypertension than the physicochemical constitution of the indigenous spring water.

We are told that carbon dioxide baths, when given to persons with aortic atheroma, can preserve renal and cardiac functioning indefinitely. Patients with compensated valvular disease, chronic Bright's disease, left ventricular failure, right ventricular failure *et cetera* are all advised to book early at Royat. The need for digitalis is thereby postponed considerably. With the growing appreciation of the importance of the sensitivity of the central nervous system in the genesis and severity of *angina pectoris*, advice that certain patients lose their pain at Royat is less surprising. The statement that "valvular cardiopathies, perhaps even more clearly than hypertensives, constitute an indication for cure at a carbon dioxide resort" indicates the loose clinical thinking and phraseology which makes spa physicians such difficult people to argue with. Like Deschamps, many are most excellent clinicians, and in dealing with the individual patient would certainly not invariably display the unidirectional enthusiasm which characterizes their writings.

[1] "Royat Treatment in Cardiovascular Disease", by P. N. Deschamps, M.D.; 1935. London: Baillière, Tindall and Cox. Demy 8vo, pp. 119. Price: 5s. net.

So the list of indications grows as the book proceeds, covering almost the whole gamut of circulatory disease. Scant space is accorded peripheral vasomotor disorders, which is surprising, as hydrothermal treatment has here won a deservedly popular place; but the author's comment is again favourable. The only contraindications are grave heart failure, uræmia and infective endocarditis. Patients should stay at least twenty-five days and make the pilgrimage twice a year if possible. A section on technique is provided, which is of more interest to the bath attendant than to the clinician. Application of the waters by inhalation, vaporization and douche is described, but intravenous therapy has been abandoned as useless. The chapter on correlative hygiene and diet is one of the best in the book, and it is refreshing to note that no extreme views on diet are admitted. The patients are seen after each four days' treatment, whence attention is directed to arterial tension, pulse rate, body weight, urinary rhythm and even the electrocardiogram. Royat, 1,500 feet above the sea, is assuredly a boon, perhaps dull, perhaps expensive, to its temperamental Latin visitors. The book has no illustrations. The translation is good and educative. We have added four new words to our vocabulary: "eupnœic", "emotive", "eupeptic" and "anti-urœcœmic".

X RAY THERAPY.

IN "The Principles and Practice of X-Ray Therapy" the author, Dr. F. Roberts, presents a concise *résumé* of the subject.[1] Sufficient physics has been included to refresh the mind of the radiotherapist on the physical principles involved, and orthodox opinions are contained in the early chapters concerned with this aspect of the subject.

The employment of mathematical equations to express physical phenomena should be accompanied by sufficient explanation in the text to render such equations self-explanatory. The lack of detail in this connexion may be excused in consideration of the condensed character of the work. It might therefore be preferable if some of the more obscure physical data were omitted.

In dealing with the biological effects of X rays the author insists on the importance of the limitation imposed by the skin erythema. His method of arriving at depth dosage is reasonable, and his support of the multiple transfixation method employing numerous small fields seems commendable. Adequate dosage at depth may be achieved in this way.

The unreliability of chemical methods of estimating dosage is stressed, particularly when hard rays are employed.

The measurement of quantity by means of the iontoquantimeter is well explained, and the requirements of a suitable instrument in relation to accurate measurement in "*r*" units are discussed.

The relation between the international unit and the erythema dose is discussed and reasons are given for the variation of this relationship when varying voltages are employed.

The author stresses the shortcomings of the alternative spark gap as a measure of quality, the impracticability of most spectrometers, and he expresses preference for the percentage depth dose, giving particulars of voltage, filtration and focal skin distance.

He advises the employment of a constant potential generator, a focal skin distance of 30 or 40 centimetres, a filter of one millimetre of copper backed by one millimetre of aluminium.

A good description of his methods of achieving cross-fire irradiation by the employment of very small fields arranged to produce multiple transfixation is given. The necessity for accurate centring is stressed, and his method of achieving this accurate centring is described. The employment of a flexible curve for this purpose suggests considerable ingenuity.

The author argues effectively in favour of his method of delivering a large depth dose through small fields divided into daily doses, as opposed to the method of Coutard, who employs high voltage, large fields, heavy filtration and long focal distance, with low minute-intensity. He claims for his method less possibility of gross and permanent damage to the skin than may be the case when Coutard's method is employed.

The section dealing with the biological action of X rays on the tissues briefly covers most of the literature on this subject.

The author's contention that the increased resistance of tissues to successive doses of irradiation is due to the resistance from the outset of the parent cells of the tumour will not in all probability find general support.

The chapters dealing with the treatment of malignant disease in various sites comprise a *résumé* of the author's personal experience; and he quotes a number of successful and interesting results, particularly in two cases of carcinoma of the œsophagus. The time which had elapsed since the completion of treatment was, however, short—six and eight months respectively.

[1] "The Principles and Practice of X-Ray Therapy", by F. Roberts, M.A., M.D., M.R.C.P., D.M.R.E.; 1936. London: H. K. Lewis and Company, Limited. Demy 8vo, pp. 225, with 115 illustrations. Price: 10s. 6d. net.

PAPERS ON NERVOUS AND MENTAL DISEASE.

THE sixth volume of "Annals of the Palermo University Clinic for Nervous and Mental Diseases" contains some forty papers by Professor Colella and his colleagues published during 1934-1935.[1] Several papers are devoted to the treatment of cerebral hæmorrhage and its sequelæ by the injection of 25 cubic centimetres of the patient's own blood into the gluteal region on the sound side. Professor Colella claims remarkable improvement in cases of fractured base of the skull with post-traumatic coma, as well as in hemiplegia from cerebral hæmorrhage and thrombosis, and reports that improvement in function often occurs immediately after the injection. In another paper it is stated that 33% of children attending the out-patient and in-patient departments of the clinic give a positive Wassermann reaction in the blood serum, while 57% of children with mental abnormalities, including delinquents, bear evidence of hereditary syphilis. As regards special clinical types, 38% of mental defectives, 40% with organic brain disease and hydrocephalus, 27% of epileptics, and 37% of psychopathic and delinquent children give a positive reaction in the blood serum. These figures are, of course, much higher than those found by British workers. Dr. Tripi investigated the blood bromine content in schizophrenia and reports a subnormal amount in catatonics and paranoids (50% to 80% of the normal). In 1932 Zondek reported a subnormal bromine content (the normal value being 0·8 to 1·0 milligramme per 100 cubic centimetres of blood) in manic-depressives, but other investigators have failed to find any definite correlation between mental states and the bromine value. Other papers deal with the sedimentation rate in nervous and mental disorders and the treatment of epilepsy by acetyl-choline. The application of anti-rabetic vaccination to early cases of *dementia præcox* with a view to counteracting a supposed toxic basis failed to give satisfactory results. Nine papers by Professor Colella are devoted to responsibility in mental disorders and other subjects of medico-legal interest. The volume reflects the multifarious interests of the staff of the psychiatric clinic of the University of Palermo and contains many interesting contributions to our knowledge of nervous and mental disorders.

[1] "Annali della Clinica delle Malattie Nervose e Mentali della R. Universitá di Palermo", Volume VI, 1934-1935; edited by R. Colella; 1935. Palermo: Industrie Riunite Editoriali Siciliane. Demy 4to.

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SOCIOLOGICAL MEDICINE.

MEDICINE may be considered from many points of view, and most of them have been discussed in these pages from time to time. Curative medicine is always with us. Collective medicine and individual medicine have been brought to the fore, and latterly constitutional medicine has been discussed. Preventive medicine has been set up as an ideal and a great deal of the effort of medical practitioners has been directed towards its practice. In what is known as sociological medicine we have an even more comprehensive conception. Dr. René Sand has described sociological medicine as the art of prevention and cure considered in its scientific basis and in its individual and collective applications from the point of view of the reciprocal relations which connect the health of man with his living condition.[1] Man is largely a creature of circumstance and the dangers of his economic, occupational and moral environment have a bearing on his health. "From one trade to another, from one quarter to a neighbouring district, from the married woman to the unmarried mother, from the legitimate child to the bastard, death slackens or quickens its pace." Obviously the whole of medicine, curative as well as preventive, must be associated with social science. Sand insists that to visualize sociological medicine from a national point of view is to weaken and mutilate it. In the same way as the development, structure and functions of the different species of animal and vegetable life are explained only by comparative embryology, comparative anatomy and comparative physiology, so can sociological medicine be properly understood only by a study of the data it has collected and the measures it has inspired throughout the world.

Dr. René Sand's essay is a most important study. He shows what has been done in certain directions and in certain places; he shows how much remains to be done. What is more, he leaves the reader with the conviction that sociological medicine can be carried to its ultimate goal if men and women are determined to that end. This surely is a subject worthy of more than passing thought at a time when war is being fought and when the air is pregnant with rumours, forebodings and fears of further wars. Sociological medicine implies at least an interest of one man in his fellows, if not the actual care of one for another; it implies cooperation of persons, of communities and of nations. If peoples and nations cease to delude themselves and examine their motives, if they have any ideas at all on the bodily, mental and spiritual welfare of mankind, they will not find it so easy to repeat the most colossal mistake of our time, the mistake of 1914, nor to inflict again the same cruelties and deprivation on mankind.

Sand examines the social classes and discusses in relation to them density of population and the distribution between country and town. In Russia, in the Balkans, and in Asia about 15% of persons live in the towns. In France, the United States of America, Canada and New Zealand the percentage is about 50%; in Scotland it is 75% and in England 80%. Until quite lately the morbidity and mortality rates have been higher among city dwellers than amongst those in the country. Sand

[1] "Health and Human Progress: An Essay in Sociological Medicine", by R. Sand, with preface by E. Herriot; 1935. London: Kegan Paul, Trench, Trubner and Company, Limited. Demy 8vo, pp. 288. Price: 10s. 6d. net.

computes that on an average each person suffers from an illness of twenty days' duration every other year. The cost of sickness is enormous. For example, early in this century Freudenberg estimated that the annual cost of sickness in Germany in attendance, assistance and loss of wages was 3,200 million marks. The human capital lost every year by death was 10,500 million marks. Prevention costs less than cure. Thus we can inoculate fifty children against diphtheria for the sum which represents the cost of hospital treatment for one diphtheritic patient. It costs four times less to rear the child of a consumptive in a healthy family than to treat it with uncertain result after it has been infected. There is physical and mental inequality between the social classes. The countries most advanced from the economic and social standpoint have succeeded in combating poverty and in attenuating its effects to such an extent that at birth there is no appreciable difference in the average size and weight of infants belonging to the different social groups. On the other hand, after birth the growth of the child is influenced by its social environment, and this is seen in all countries. There is considerable inequality of the social classes in regard to sickness and death. The chapter in Sand's book on this subject is one of the most interesting that it contains. He shows that there are diseases of the poor, diseases of the rich and diseases which affect the different social classes more or less equally. On the whole, he contends, the general mortality, but especially infant mortality, and that from tuberculosis and infectious diseases furnish the best index of social inequalities. The reduction of the general death rate in a country indicates improvement in hygiene and better conditions of existence for the population taken as a whole: it is the index of national progress. This leads to a consideration of hereditary and environmental factors, which cannot be entirely separated. Most people will agree that it is impossible to deny the possible influence of physical and mental influences on the inherent characteristics of succeeding generations. "To assume that social stratification corresponds to a constitutional stratification is a childish notion which dates from a time when labourers and peasants . . . hardly resembled human beings."

A brief outline of Sand's argument has been given. As already pointed out, social service must take a large share in attaining the goal of sociological medicine. Sand asserts that social work is defective because it is often scattered, there is a lack of method and continuity in the protection granted and there is a delay in instituting action. In recommending this book to the careful study of all the thinking members of the community, we can best conclude with the following quotation:

> Since a human being declines or becomes perverted if over-work, poverty or neglect drag him below the level of an existence compatible with the maintenance of his physical and moral health, *the first rule is to ensure that no one at no time shall be wanting in this necessary minimum.* Sociological medicine demands the provision, *by collective measures*, of favourable labour conditions, good housing, decent wages, generalised insurance, sanitary, technical and educational services, to be completed by the *individualised action* of medical and social case work.

Current Comment.

THE RELATION OF BRUNN'S NESTS TO CYSTITIS GLANDULARIS AND ADENO-CARCINOMA OF THE BLADDER.

A PATHOLOGICAL curiosity is the occurrence of leucoplakia in the bladder, renal pelvis and ureter, which have a mesoblastic or hypoblastic origin. In 1924, F. Hinman, A. A. Kutzmann and T. E. Gibson expressed the opinion that, whatever the underlying cause of the leucoplakial condition might be, the actual change was a protective cornification and that such a pathological condition could maintain a permanent state of chronic inflammation, even though the calculus or persistent infection, which was the original source of irritation, had disappeared. The condition, they thought, was prone to become malignant. Non-papillary carcinoma of the renal pelvis is said almost always to be preceded by leucoplakia, calculus or infection. A similar form of carcinoma of the bladder often follows leucoplakia. Syphilis probably has no connexion with the leucoplakial condition.

F. S. Patch and L. J. Rhea have contributed an exhaustive study of the genesis and development of the epithelial nests of von Limbeck and von Brunn and their relation to leucoplakia, *cystitis cystica, cystitis glandularis* and primary adeno-carcinoma of the bladder.[1] According to R. von Limbeck (1887) and A. von Brunn (1893), the first step in the formation of cysts in *cystitis cystica* is the pro-

[1] *The Canadian Medical Association Journal*, December, 1935.

jection into the submucosa of buds from the inferior layer of vesical epithelial cells. These are now known as "Brunn's nests". A lumen forms in the centre of the cell nest. This has been ascribed either to degeneration or to a secretory process. It has also been suggested that the cell nests and cysts are congenital but do not develop till after birth. This theory has little to recommend it. The nests are very rarely seen in early life. In the central part of a Brunn's nest a round droplet appears and the adjoining cells take a concentric radiating position around it. The cells are arranged in layers, of which the inner assumes the characters of secreting epithelium. This mucous membrane has a latent capacity for gland formation. The association of cell nests with inflammatory lesions of the epithelium suggests that they are pathological, and similar formations have been produced experimentally in laboratory animals. R. Giani asserts that every cause that, during a certain time, stimulates the epithelial cells to more active proliferation can induce the development of Brunn's nests. After lumina have formed in the nests the cavity may enlarge and the epithelial lining thin out so that a cyst develops; or gland formation occurs (*cystitis glandularis*), with the secretion of pure mucus. Areas of bladder epithelium may be converted into structures like the mucosa of the large intestine, and it has been suggested that *cystitis glandularis* results from embryonal inclusions of germinal cells of the lower part of the intestine.

Patch and Rhea urge that the underlying cause is not developmental, but is a metaplasia of the vesical epithelium, the surface epithelium being replaced by mucus-secreting cells. The changes are analogous to those in the bladder mucosa leading to leucoplakia. In one case the bladder transitional cells are transformed into cylindrical cells which secrete mucus; in the other the epithelium is converted into a squamous form. In exstrophy of the bladder the two processes take place side by side. Probably squamous-celled carcinoma of the urinary tract needs an antecedent leucoplakia for its development, and *cystitis glandularis* may undergo analogous metamorphosis into a mucus-secreting adeno-carcinoma. Patch and Rhea urge that the metaplastic processes which have been set up in *cystitis glandularis* and have resulted in a new type of epithelium could readily be a factor in the development of certain malignant vesical growths. In their common cloacal development the bladder and large intestine are so closely related that it is difficult to deny the possibility of intestinal epithelium being misplaced into the bladder. But Patch and Rhea insist that evidence of the evolution of *cystitis glandularis* is so striking that it is logical to assume that primary mucus-secreting malignant vesical growths result from metaplasia of the bladder mucosa and not from embryological inclusions from the large intestine. Similar conditions of *pyelitis cystica* and *glandularis* have been observed, and the theory of embryonic inclusions could not have nearly the same force in connexion with the renal pelvis. Enderlen, examining exstrophic bladders of the new-born, never found cylindrical epithelium or glandular invaginations. He considered that pseudoglands (*cystitis glandularis*) appeared later under the influence of multiple traumata. Patch and Rhea consider that areas of vesical mucosa as a result of metaplasia alter to assume an epidermal or glandular type, and malignant tumours of either type of cell are possible and, in fact, do occur. Patch and Rhea, examining tissues removed from an exstrophic bladder of a child of three, were able to follow the development of Brunn's nests and observed their evolution into *cystitis cystica* and *glandularis*. They could not categorically deny that mucus-secreting cells in the bladder had developed from misplaced embryonic tissue, but they found no necessity to make such an assumption. Certainly some, and probably all, of such cells resulted from metaplasia of the vesical epithelium. Other metaplastic changes observed by these investigators were well-developed areas of leucoplakia.

They also report a case of mucus-secreting adeno-carcinoma of the bladder which they considered to have originated from *cystitis glandularis*, but, in the absence of an autopsy, conclusive proof was not obtained.

The opinions of Patch and Rhea that metaplastic changes in the vesical epithelium produce the mucus-secreting epithelial cells are certainly more credible than that such cells are derived from epithelium misplaced during embryonic development. *Cystitis cystica*, and especially *cystitis glandularis*, must be deemed to be potential pre-cancerous lesions, and from the latter mucus-secreting adeno-carcinoma may originate. Patch and Rhea frankly admit that the details of the progressive changes in *cystitis glandularis* leading to adeno-carcinoma have not been demonstrated, but they are sanguine that further histological study will furnish the proof. It is quite likely that proof will be forthcoming, as these authors give convincing evidence for their theories. A careful perusal of the article will well repay the time spent.

CANCER OF THE LUNG.

Cancer of the lung is supposed to be one of the neoplastic diseases which are becoming more common, but the truth of this assumption has been questioned by several authorities. The disease is, of course, being recognized much more frequently, and at much earlier stages, as is evidenced by the study published in this journal based upon the consideration of actual patients and not solely upon autopsy material. Many of the published studies are purely pathological, but these are extremely valuable, since, even though they concern an end-state only, they are accurately proved and investigated. R. H. Jaffé has recently reviewed 100 autopsies of cases of primary carcinoma of the lung.[1] At the outset

[1] *The Journal of Laboratory and Clinical Medicine*, September, 1935.

of his paper he refers to the supposed increasing frequency of the disease and points out that this question is not yet settled. In passing we may refer to another article recently published on this subject of frequency. R. D. Passey and J. M. D. Holmes adopted a new method of approach to the problem.[1] They obtained the relevant statistics of over twenty teaching hospitals in Britain and analysed them. In sixteen hospitals no increase in the incidence of lung cancer could be demonstrated; in five other hospitals a frank increase was evident, but the authors think that this depends upon certain associated circumstances. For example, the establishment of clinics for the diagnosis and treatment of pulmonary tuberculosis may well produce an increased accuracy in the diagnosis of lung cancer; so too will a greater interest in the disease by members of the medical staff.

Returning to the pathological analysis of Jaffé, this author reports a percentage of 11·47 of lung carcinoma among all carcinomata, a figure comparing very closely with that of 10·73% obtained by the same writer in a previous series collected in Vienna. In his experience any increase is more apparent than real. Jaffé agrees with all other workers that lung cancer is much more common in men than in women, and that it most usually begins in the fifth decade. The right lung is involved rather more often than the left. No special light is thrown upon the ætiology of the disease by this study, except that evidences of syphilis occurred more frequently among these patients than among others. It would appear that the greatest percentage of diagnostic errors came from the cases showing a peripheral type of growth, and Jaffé also lays considerable stress on the difficulty of diagnosis in cases in which early metastasis occurs. This is a matter of very great importance, for if the treatment of carcinoma of the lung by surgical removal or by some form of irradiation is to be of any practical value, it is obviously necessary for the clinician to be as well informed of the more usual locations of metastatic deposits as he is in, say, cancer of the colon. The thoracic lymph glands were infiltrated in 89% of the author's cases, and next in order of frequency came the other lung, the adrenals, abdominal glands, liver, kidneys, bones and brain, besides other less common locations. The last-named organs should stand higher on the list, as the author himself admits, for adequate examination could not be made in all cases. Perhaps his most valuable remarks are those on biopsies. He quotes the high percentage of positive findings in cases of lung carcinoma examined by bronchoscopy in Jackson's clinic, but more interesting to the rank and file will be his figures referring to lymph glands. In no less than twenty-eight cases out of the hundred could enlarged glands be felt during life, usually in the cervical and supraclavicular regions, and in a few cases the submaxillary, axillary and inguinal glands were palpably enlarged. This should stimulate all concerned to examine their patients very carefully by the simple method of feeling the regions of the more commonly involved lymphatic glands. In two cases skin nodules directed the physician's attention to the true nature of the case. Not only is it important to establish an accurate diagnosis in all these cases, but, if the presence of metastases is overlooked, special surgical methods of dealing with the primary growth may thereby be brought into disrepute.

[1] *The Quarterly Journal of Medicine*, July, 1935.

THE USE OF BELLADONNA IN GASTRIC DISORDERS.

Belladonna or its principal alkaloid, atropine, has long been employed in the treatment of certain peptic disorders. With a wider dissemination of physiological and pharmacological knowledge there has been some lessening of the enthusiasm felt for these drugs, but many still have faith in them. Walter A. Bastedo has published an interesting summary of the available laboratory and clinical observations on this subject, and he remarks that he thinks, as he did sixteen years ago, that the reliance of physicians upon belladonna and atropine as a means of relieving hypersecretion or spasm of the stomach is not justified.[1] He first calls attention to the following general propositions which may be considered as well established: (i) that the stomach possesses intrinsic tone and rhythmic motility, even though its nerves are severed; (ii) that the vagus and splanchnic nerves are not actual motor antagonists, though the former increases tone in the stomach wall, while the latter decreases it and stimulates the pyloric sphincter; (iii) that the vagus and sympathetic are not in continuous reciprocal activity, and (iv) that atropine acts chiefly by depressing vagal activity, but may act on all the nervous structures. Bastedo then traverses the experimental evidence concerning the effects of atropine upon secretion and motility. It has been established that in man not even large doses of atropine will prevent gastric secretion, for several observers have found that even though the other well known symptoms of atropine over-dosage are present, acid will still be secreted by the gastric mucosa. The effect upon all individuals is not identical of course, but, except by going to the length of producing very uncomfortable side effects, it is difficult to influence the secretory activity of the stomach greatly in this way. In regard to the motor functions there is a good deal of confusion. Some workers report that small doses of atropine may be tonic in effect rather than inhibitory, but that larger doses diminish gastric tone. Spasm of the stomach may be relieved by the belladonna preparations if the spasm is a vagus effect, but Bastedo claims that it is not always due to vagal over-activity, for intrinsic irritability of the stomach may occur. Certain other observers have reported that pylorospasm is produced or increased by atropine, which is in concordance with its known

[1] *The Journal of the American Medical Association*, January 11, 1936.

action on the neural mechanism; but the author holds that spasm of the pylorus may be a vagal or a splanchnic effect or a psychic effect of unknown mechanism, or again, that it may be due to local irritation.

Faced by this uncertainty, we must admit that we do not seem to be dealing with a clear-cut issue. The dogmatism which explains increased motility of the stomach wall or increased tone of the sphincters by a definite and simple neural mechanism does not seem to be justified, nor does the pharmacological belief that rests upon this basis. A point brought out in the discussion of this paper is significant, concerning the exact nature and degree of the alkaloid content of belladonna. Bastedo recalls that in a Canadian drug store the strongest specimen of stock tincture of digitalis was eleven times the potency of the weakest, and that perhaps the same situation existed for belladonna, in spite of pharmacopœial standards. Even so, there seems warrant for his criticisms, and he believes that though in single maximal doses by hypodermic injection atropine may limit secretion or spasm, there is little value in the doses usually employed by mouth, or, indeed, in those doses that are permissible for constant use. Certain physicians who have used very large doses of the belladonna group of drugs in the treatment of the Parkinson syndrome have not observed any very evident effect upon the digestive functions of their patients, though this observation of itself is of no real value. But we must admit that if we prescribe belladonna in gastric disorders, it should be with a clear idea of its indications and probable action, and its administration is probably of little use unless it is given, as a well known Australian clinical teacher used to say: "boldly, gentlemen, boldly, yet with caution".

UNTREATED CANCER OF THE RECTUM.

Medical literature is full of reports on the results of the treatment of cancer in different organs of the body. Cases are grouped according to the survival of patients for different periods, for example, one, three or five years; and on these results claims are sometimes made for the effectiveness of one or other form of treatment. Not many studies have been made of the length of survival of cancer patients who receive no treatment at all. Patients or their relatives may question the advisability of submission to a major operation, because of the immediate risk to life, the mutilation certain to follow, or the ordeal of the operation itself. Certain malignant growths are known to be of slow growth, while others grow rapidly and soon produce metastases in other organs. It is for many reasons essential that medical practitioners should have some idea of what is likely to be a patient's expectation of life if he refuses treatment or if he seeks advice when treatment would be of no avail.

E. M. Daland, C. E. Welch and I. Nathanson have studied a group of one hundred patients suffering from cancer of the rectum who received no treatment at all.[1] In thirty-five of the hundred cases a diagnosis of carcinoma was made by microscopic examination either from biopsy or *post mortem* material. Although the actual beginning of cancer must have antedated the first symptoms, a change in bowel habit was taken as the indication of the onset of the disease. Of the utmost importance are the reasons why these patients remained untreated. These Daland and his fellow authors cannot state with certainty. Some patients were too old or in too poor condition. Some were deterred by the thoughts of a colostomy or by the magnitude of a radical operation. In some instances the disease was too far advanced when the patients first sought advice. In other instances again—this would probably be found in any part of the world—the medical advice received by the patient before his admission to hospital had been "poor". This poor advice was the result of prejudice against colostomy, lack of faith in surgery or else (standing reproach to the clinician) inadequate rectal examination.

In the series there were fifty-six males and forty-four females; the youngest was thirty-two and the oldest ninety-two years of age. The average age at onset of symptoms was 59·6 years. The median age was fifty-nine years, that is, there were as many under fifty-nine years of age as there were over it. The cases were fairly evenly distributed between the ages of forty-five and seventy-five; 20% of the cases were found outside these limits. In each age group there was no significant variation in the duration of life from the onset of symptoms until death occurred. The average length of life was 17·2 months; the median length of life was fourteen months. One patient died one month after the onset of symptoms; the longest duration was forty-nine months.

In order to determine whether colostomy prolongs life, these authors examined the records of eighty patients in whom colostomy was performed without any other treatment. Fifty-nine were males and twenty-one were females. All the patients died of cancer, the length of life varying from two to fifty-six months after the onset of symptoms. The median length of life from onset to treatment was seven months, from treatment to death five months, and from onset to death fourteen months. The average length of life following colostomy was six months; the average time from onset to death was 16·9 months. There were seven deaths as a direct result of operation.

That colostomy did not prolong life appreciably is not surprising. Colostomy, however, may give great relief to a sorely stricken patient; and "a well functioning colostomy opening is much easier to care for than an incontinent rectum". As far as the technique of colostomy is concerned, we would draw attention to an article by H. B. Devine that appeared in *The Australian and New Zealand Journal of Surgery* of January, 1934.

[1] *The New England Journal of Medicine*, March 5, 1936.

Abstracts from Current Medical Literature.

GYNÆCOLOGY.

End-Results with the Watkins Interposition Operation.

Houston S. Everett (*Surgery, Gynecology and Obstetrics*, September, 1935) reports the results in the Department of Gynæcology of the Johns Hopkins University in a series of cases in which the Watkins interposition operation has been done. The author states that when used in properly selected cases it is a most satisfactory procedure. The use of the operation is restricted to patients near, at or past the menopause, except occasionally when child-bearing is strongly contraindicated. In such cases a careful tubal sterilization is done at the time of operation. Following this rule they have had no pregnancies in the past eighteen years. They use the operation for complete procidentia as well as for lesser degrees of prolapse. During the years 1927 to 1931, sixty-eight patients were submitted to the interposition operation. All but nine were 45 years old or older, and all but nine were past the menopause. The oldest patient was 78, the youngest 26 years of age. The cervix was amputated in forty-eight patients. A perineorrhaphy and posterior colporrhaphy were done in all except three cases. One patient died of pulmonary embolus. Sixty-seven others were discharged well after an average stay in hospital of twenty-two days. The patients were kept in bed for two weeks after operation. Of forty-eight patients followed up, all but two had excellent results. Two had moderate degrees of prolapse. The author considers that in the experience of his school the Watkins interposition operation is the procedure of choice for the treatment of prolapse of the uterus in women past the menopause. It gives better permanent results than vaginal hysterectomy; it is easier to perform, and, if a recurrence does occur, a second repair operation is easier to perform. The author believes that vaginal hysterectomy is most useful when repair is necessary for the cure of cystocele and prolapse and when the uterus is in such a pathological condition that it should be removed at the same time.

Some Newer Aspects of Reproductive Physiology.

Emil Novak (*American Journal of Obstetrics and Gynecology*, October, 1935) discusses some of the recent advances in reproductive physiology; he makes no attempt to cover the whole field, but to pick out a few problems. Four subjects are selected by the author: (i) the newer studies in the chemistry of the sex hormones, (ii) the possible participation of the posterior lobe and the parahypophyseal portion of the mid-brain in the reproductive cycle, (iii) the question of so-called anovulatory menstruation, and (iv) the endocrine factors in menstrual bleeding. In respect to chemistry of the hormones, the amount of research is stupendous, and hormones tend to show a close relationship to the sterol group, the bile acids, certain vitamins and varicus carcinogenous substances. It has been shown that œstrin exists in a variety of forms, each having slight alteration of formulæ and difference of potency. The author asks whether they are all from the same source and whether the œstrin in the urine during pregnancy is identical with that produced by the ovaries. The *corpus luteum* hormone (progestin) has the formula $C_{21}H_{30}O_2$ and œstrin variation of $C_{18}H_{22}O_2$. The close structural change between these two hormones and the male sex hormone, $C_{19}H_{28}O_2$, is very striking. A surprising fact is the amount of male hormone found in the urine of women. The urine of the mare and the urine of the stallion are both rich in œstrin. All these relationships lend themselves to much speculation as to chemical changes that take place in the body. A further point for consideration is the relationship between the sex hormones and the so-called carcinogenic substances, such as certain tar derivatives, certain of the sterols, which the hormones chemically resemble, are not only œstrogenic, but also carcinogenic in nature. There is other evidence of the relationship between the endocrine organs and cancer, such as the frequent occurrence of positive results to the Aschheim-Zondek test in cases of female genital cancer and the finding of large amounts of œstrin in the blood of cancer patients, even when they are males. As further evidence might be added the work of Lacassagne, who has reported the production of mammary cancer in three male mice of a strain in which the disease spontaneously affects only the female, by means of the injection of oily solutions of œstrin.

Eugenic Sterilization.

G. Haselhorst (*Deutsche Medizinische Wochenschrift*, October 18, 1935) reviews the indications and technique employed in 100 cases of eugenic sterilization at the Rostock Clinic. The indication in 69 instances was congenital feeble-mindedness; schizophrenia occurred in eleven cases, while smaller numbers were noted of congenital deafness or malformations. Nearly half the patients were less than twenty-five years of age. The usual operation was cornual excision of the tubes and covering the incision with the round ligament or vesical peritoneum. In eleven cases the operation was done by the vaginal route. The anæsthetic generally employed was "Evipan" followed by ether. On an average the patients remained in hospital for fifteen days. In seven cases the operation was postponed either because of long-standing sterility or the fear of complications in inflammatory cases. As a guide to sterility the author considered that the following criteria were useful: virginity in women over forty years of age; non-pregnancy in women of the same age after coitus for some time; marked genital hypoplasia or extensive chronic salpingitis in women over thirty.

H. Naujoks (*Monatsschrift für Geburtshülfe und Gynäkologie*, December, 1935) discusses the respective advantages of sterilization by operation and by radium. While the operative method remains the method of choice in the majority of cases, radium should supplant it if certain conditions are present: marked obesity, patients near the menopause, furunculosis of the abdominal wall. When operation is decided upon, the author prefers the Alexander-Adams incision with opening of the peritoneum and withdrawal of the tube. The latter is then folded upon itself, crushed with forceps and the ends of this area ligated. The distal ligature is used to close the peritoneal incision and the uterus is brought forward by shortening of the round ligaments. Naturally, in cases of retroversion with adhesions the abdomen is opened in the usual manner.

A. F. Scheffzek (*Monatsschrift für Geburtshülfe und Gynäkologie*, January, 1936) discusses his experiences with 430 patients who were sterilized for various indications. The majority of patients were congenitally feeble-minded or else suffered from schizophrenia. No pathological conditions of the genitalia were found in 379 cases. The most difficult patients to deal with were those suffering from schizophrenia; the most amenable, the congenitally feeble-minded; while epileptics lay midway between these extremes. The author noted that the incidence of epileptic attacks was unaffected by the operation. For patients near the menopause X ray castration was preferable to operative procedures. Rectal or intravenous basal anæsthesia was very valuable as a preliminary to general anæsthesia, while during the early convalescence the patient should be kept well under the influence of narcotics. Unless this is done, nursing is difficult and the struggling tends to hinder healing of the incision.

Technique of Sterilization.

P. W. Siegel (*Deutsche Medizinische Wochenschrift*, October 18, 1935) discusses the value of the inguinal route for sterilization, as advocated by Menge. The canal is opened as in the Alexander-Adams operation. The peritoneum is incised and the tubes are brought forward and resected and then implanted in the canal with the

shortened round ligaments. In 181 cases it was possible to perform this operation in 95%. The only contra-indications to this procedure are firm adhesions with retroflexion or the presence of tumours of the adnexæ. For such cases the Pfannenstiel incision can be used to open the abdomen. This was required in only three cases of the author's series.

OBSTETRICS.

Obstetrical Analgesia.

H. Gercke (*Monatsschrift für Geburtshülfe und Gynäkologie*, August, 1935) describes his results with the barbituric derivative, "Rectidon". This is administered *per rectum* with a maximum dose of 1·5 cubic centimetres per 10·0 kilograms body weight. It is given when the os admits three fingers in *primigravidæ*, and when labour has commenced with *multiparæ*. Its action is noted in fifteen minutes, and the effect lasts for six to eight hours, with an optimum effect in three hours. The author used it in 105 cases with success. No after-effects were observed and the fœtus was not affected. Care has to be taken regarding the third stage. If delivery follows within one hour of its administration or if the effect of the drug be still marked after the end of the second stage, there is a definite tendency to *post partum* hæmorrhage.

Treatment of Hyperemesis.

H. Seyffardt (*Monatsschrift für Geburtshülfe und Gynäkologie*, October, 1935) discusses the various remedies used for the treatment of the vomiting of pregnancy. He has obtained great success with a preparation of aluminium silicate called "Puractin S". The salt is dissolved in a glucose solution and when prepared resembles lemonade in taste. It is readily tolerated by patients and its glucose content is of considerable assistance in the treatment. It is also cheap.

Pituitary Lesions Associated with Parturition.

L. Seitz (*Monatsschrift für Geburtshülfe und Gynäkologie*, July, 1935) discusses various diseases of pregnancy and the puerperium which can be attributed to disturbances of the pituitary gland. During pregnancy some patients suffer from increase in size of the extremities, nose and chin, which closely resembles acromegaly; in others the symptoms of polydipsia and polyuria produce *diabetes insipidus*. During the lactation period superinvolution of the uterus may occur. It has little connexion with the time during which the infant may have been kept at the breast. The author considers that the atrophic uterine condition is a sign of an excessive involution of the pituitary which was enlarged during pregnancy. Cases of excessive deposition of fat and abortive forms of Simmond's disease have probably the same origin. If the pituitary does not involute normally it may cause uterine subinvolution and menorrhagia. Naturally, before a conclusion of this sort is formed any local uterine lesion must be excluded. The paper is illustrated with several histories.

The Unfixed Head in Primiparæ.

J. Farkas (*Monatsschrift für Geburtshülfe und Gynäkologie*, September, 1935) discusses the ætiology of non-engagement of the head at term in *primiparæ*. In a series of 71 cases the head was still free at term in 28 cases; nine of the patients were elderly *primiparæ*. In four cases non-engagement was due to contracted pelvis. If these are excluded as well as the elderly *primiparæ*, 22·6% of the *primiparæ* are left in whom no obvious cause could be discovered. In the author's records for ten years the percentage of non-fixed heads in 3,779 *primiparæ* with no pelvic contraction was 6·7%. Premature rupture of the membranes was noted in 52%, but spontaneous delivery occurred in 97·3%. The length of labour varied: two-thirds of the patients were delivered within twenty-four hours and 21% took more than thirty-two hours. A quick labour lasting not more than eight hours was observed in 15% of the cases. Posterior position of the occiput was noted in only one case, nor did the size of the child have any apparent effect. If the head engaged immediately after the onset of uterine contractions, the duration of labour did not vary from the normal. When delay occurred, Cæsarean section generally was performed after a short trial of labour. While the author considers that weak pains, a flabby uterus and pendulous abdomen play a part in the ætiology of this condition, the main cause is usually a pathological state of the lower uterine segment and cervix. Because of this possibility all such patients should be delivered in hospital.

Premature Rupture of the Membranes.

E. W. Winter (*Monatsschrift für Geburtshülfe und Gynäkologie*, July, 1935) considers that the incidence of premature rupture of the membranes has greatly increased during the past decade. He emphasizes the seriousness of this complication of labour. In a series of 573 cases four mothers died, the stillbirth rate was 9%, while many cases were morbid. The longer the time before delivery took place, the worse was the prognosis, especially if operative procedures were employed. He recommends in cases where uterine contractions are poor, a dose of castor oil followed by quinine. The latter sensitizes the uterus and in many instances no more is required. If regular contractions do not occur, pituitary extract in doses of one and a half units is repeated for several injections. If no result be obtained, the uterus can be further sensitized by intravenous injections of calcium combined with glucose saline solution. In cases in which no result is still obtained, a rest should be given with an injection of morphine, followed next day by further stimulation. If any uterine spasm be noted, belladonna suppositories are invaluable. When premature rupture occurs in the early months of pregnancy, medicinal stimulation is generally useless, and packing of the cervix with gauze or the use of a bag is indicated.

Obstetrical Anæsthesia.

H. Buschback (*Deutsche Medizinische Wochenschrift*, October 18, 1935) reviews the advantages and disadvantages of the various methods of producing anæsthesia during labour. He is opposed to the use of chloroform, even when given *à la reine*, because of the risk of sudden syncope and the delayed poisoning frequently observed in toxæmic cases. Nor does he consider that ethyl chloride has any advantages. Gas and oxygen or "Narcylene" are very useful in hospital, but too expensive for private work. At the Würzburg clinic ether is used as the sole method of anæsthesia in the second stage. The tolerance is better, there are no dangerous complications, especially if it is given intermittently, and it has no effects on the fœtus. Administration is commenced when the head is on the perineum and is repeated with each pain. If episiotomy is required, the anæsthesia can be quickly increased to the surgical degree. Uterine contractions are not affected, and, of the utmost importance, there is no effect on the third stage. The author therefore recommends ether for domiciliary practice as the cheapest, most efficacious and least dangerous anæsthetic.

The Effect of Thyreoid Preparations on Milk Secretion.

P. H. Schumacher (*Monatsschrift für Geburtshülfe und Gynäkologie*, October, 1935) has investigated the claims of Kustner that the administration of preparations of the active principle of the thyreoid will lead to a stimulation of the milk production in women. He took three groups of 50 patients; two groups were given different thyreoid preparations and the third was used as a control. His results showed that the use of thyreoid preparations had no effect on lactation. The amount of milk secreted and the increase in body weight of the infants was just as great with the control group as with those under treatment. He concludes that the usual methods of breast stimulation are much more important factors and he is waiting with interest for the results of work on the lactogenic hormone of the anterior pituitary.

British Medical Association News.

SCIENTIFIC.

A meeting of the New South Wales Branch of the British Medical Association was held in the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, on August 29, 1935, Dr. A. M. Davidson, the President, in the chair.

Cancer of the Lung.

Dr. Cotter Harvey read a paper entitled: "Cancer of the Lung: A Clinical Survey of One Hundred Cases" (see page 565).

Dr. A. T. Nisbet gave a lantern demonstration of films depicting the results of deep X ray therapy in cancer of the lung.

Dr. E. F. Thomson thanked the speakers for their excellent papers. Although the incidence of cancer of the lung was said to be on the increase, Ewing stated that there was no real increase. Until this year Ewing was the only authority who expressed this view. But recently there was published in *The Quarterly Journal of Medicine* a paper by Passey and Holmes, of Leeds, who made a study of the statistics of cancer of the lung in teaching hospitals in England (excepting those hospitals dealing solely with cancer). Their study covered a thirty-five year period, and the percentage of lung cancers was taken, not in comparison with the total autopsies, but with the number of admissions to the hospital. In the majority of teaching hospitals there was found to be no increase in the number of patients with cancer of the lung. For instance, in the period 1894 to 1898 the total admissions to all the hospitals was 315,059 and the total number of intrathoracic cancers at autopsy was 173, or 0·055% of all admissions. In the period 1924-1928 the admissions were 786,912 and the total intrathoracic cancers at autopsy 552, or 0·070% of all admissions. It would seem, therefore, that the increased incidence of the disease was apparent and not real.

In regard to the ætiology of cancer of the lung, Dr. Thomson said that the findings of Dr. Cotter Harvey were interesting. It was mostly agreed that labourers were more prone to the disease. There was the outstanding instance of Schneeberg lung cancer in miners. Lung cancer was supposed to be endemic in Schneeberg (Saxony), where 70% of miners who died, died of cancer of the lung. Among 300 non-miners who died, there were no cancers of the lung. The miners were, of course, constantly exposed to dust, and a compound of arsenic was thought to be the cause of the cancer. Some writers stressed motor cars and tarred roads as causative factors. But tar took a very long time to produce a cancer, and the gases from motor cars were a doubtful ætiological factor.

Speaking of the incidence of the condition in males and females, Dr. Thomson said that he had recently gone over the autopsy records for ten years at the Royal Prince Alfred Hospital and found that there were thirty males and only one female.

All lung tumours were of bronchogenic origin, the three types being the squamous, the columnar cell and the spindle or oat cell. The oat cell type was the commonest at the Royal Prince Alfred Hospital. Olson, writing in a recent issue of *The American Journal of Pathology*, analysed sixty-nine cases of primary carcinoma of the lung, 42% of them being of squamous type.

Dr. B. P. Anderson Stuart thanked the speakers for their splendid papers. He said that when Dr. Harvey had had a tilt at the radiologists it might be thought that there were two sides to the question; but in this instance there was only one side and that was Dr. Harvey's. It was essential for radiologists to use lipiodol; if they did not, they were ten years out of date. Dr. Stuart had found that the use of lipiodol was deprecated as a rule by men with no experience of it. Moreover, he had never seen a complication of any importance result from lipiodol. He thought that its alleged dangers did not exist, unless the drug were given by someone wholly incompetent.

Dr. M. P. Susman remarked that Dr. Thomson had said that all lung tumours were of bronchogenic origin. This was generally accepted. He wished, however, to show photographs of three specimens which had been successfully removed by Dr. Tudor Edwards, the patients being alive. These specimens had been classified at Brompton Hospital as endothelioma of the lung; they had a different appearance from that of the usual carcinoma.

While waiting for the showing of his photographs, Dr. Susman said that Dr. Harvey had not mentioned radium or radon in the treatment of cancer of the lung. If the tumour was seen early and if its spread was not extensive, the application of radon seeds in a container, which was put into the bronchus through the bronchoscope, gave relief. In diagnosis, artificial pneumothorax followed by the taking of radiograms was useful, especially if it was doubtful whether the lesion was intrapulmonary or not. Dr. Susman had seen cancer of the lung through the thoracoscope, showing through the visceral pleura. In another instance metastases were seen and the patient was saved operation.

At this stage Dr. Susman showed the photographs already mentioned. One patient had a single, well-defined X ray shadow which had been present four years before she would submit to operation. Operation had been easy, because collapse of the lung had been caused by preliminary artificial pneumothorax and the patient made a quick recovery. There had been no physical signs in this patient, and the only symptom was pain in the chest. The other two cases were similar to the first, and in both patients artificial pneumothorax was induced and the lobe with the growth was removed at operation. Diagnostic difficulties might occur when a carcinoma arose in the upper part of the upper lobe of the lung; this had been called a pulmonary sulcus tumour. The peculiarity of this tumour was that there might be no pulmonary symptoms for a long time. Dr. Susman had seen two patients with this type of growth, both of whom had neurological symptoms. One patient had pain pointing to involvement of the inner cord of the brachial plexus. The X ray picture showed an opacity at the apex of the right lung. For two and a half years pain was present in the shoulder and the right arm; there was also anæsthesia. The patient was at first sent to a hospital for nervous diseases. At operation a tumour was found to be invading the brachial plexus and ribs. The other case gave an X ray picture like a hydatid, but the lesion proved to be a cancer, eroding the ribs and body of the vertebra by the time the patient died.

Dr. J. H. Halliday also showed slides of a case of bronchial carcinoma. The case was that of a woman of forty who had developed a typical left-sided bronchopneumonia, which, however, failed to clear up and was followed by recurring attacks of fever with pain, cough and hæmoptysis. The patient had been referred to Dr. Halliday three months later, and in view of the clinical signs, X ray report and the findings on examination of the sputum, a diagnosis of probable early bronchiectasis was made. The X ray picture showed a shadow starting within the heart shadow, near the base, and extending out beyond the apex of the heart. The condition was wrongly reported as thickened pleura. It was due to collapse of this part of the lower lobe. The patient's condition remained stationary for some months, but she had recurring hæmoptysis and was again sent to Sydney. Lipiodol examination revealed a block in the left main bronchus, two and a quarter inches below the bifurcation, with collapse of the lung below. A bronchoscopic examination was then made and a cherry-red growth was discovered, which at autopsy proved to be a carcinoma of adenomatous type. Dr. Susman lent his radon container (Tudor Edwards type), which was put into the bronchus at the site of the growth and removed a week later.

Following this, cough and pain decreased and in six weeks the patient gained nine pounds in weight.

DR. C. BADHAM thanked the speakers for their papers. He wished to say a few words on three points: First, the relation of new growths to dust diseases of the lung. With the exception of Schneeberg cancer, no relationship had been established between dust diseases of the lung and cancer. Large groups of miners had been studied in South Africa and America, but no increased incidence of newgrowths of the lung had been found; and Dr. Badham himself, working in Australia, had found no increased incidence. In coal-miners' lungs he had seen only one cancer. Schneeberg miners worked in cobalt and arsenic. There was no proof that arsenic was responsible, and he thought it not unlikely that radio-active substances were the causative factor.

Secondly, Dr. Badham referred to the relationship of carcinogenic substances to cancer of the lung. He had searched the industrial literature on the subject to see if he could discover carcinogenic substances that had produced cancer of the lung. He found only one doubtful case, that of a chimney sweep who had a cancer of the scrotum which was cured and who subsequently had a cancer of the lung. The effect of tars and mineral oils in causing cancer of the skin had been thoroughly investigated. Every one of these substances was carcinogenic, but their potency differed a great deal; shale oil was very noxious. But no undoubted case had been discovered of newgrowth of the lung that was caused by tarry substances or mineral oils.

The third point brought forward by Dr. Badham was the possibility of consolidations in the lungs of miners being taken for newgrowths by the radiologists. There would be difficulty in separating consolidations due to coal dust from those due to newgrowths.

DR. E. P. BLASHKI said that the moral to be drawn from Dr. Harvey's paper was the necessity for suspecting and looking for cancer of the lung. In diagnosis the value of early bronchoscopic examination could not be over-estimated; and the bronchoscopist should be expected to report on the changes in appearance of the bronchus, the appearance of the neoplasm and the alteration of the field of view by the distortion of the bronchial tree. Dr. Blashki was glad that the value of lipiodol had been emphasized, because with this aid a different picture was produced. Bronchoscopy could be of the greatest assistance in diagnosis, and lipiodol could be applied more accurately through the bronchoscope than through the larynx or the crico-thyreoid membrane. With a modern bronchoscope a catheter could be introduced into any chosen bronchus and lipiodol could be put where it was required. The modern bronchoscope, with its telescope, gave a very different field of view from that given by the older models. Dr. Blashki had brought with him to the meeting a modern bronchoscope, from which the telescope could be removed to show how different the instrument was without it.

DR. V. J. KINSELLA thanked Dr. Harvey and Dr. Nisbet for their papers and said that he wished to refer briefly to a case that illustrated a point of interest. The patient was a woman of sixty who for six weeks had been bringing up blood into her mouth. Her medical attendant had suspected tuberculosis, but could not find any evidence of it. Radiological examination had shown opacity at the apex of the right lung, probably due to growth. Dr. Kinsella then showed a film in which he pointed out that the aortic arch was prominent on the left side and the trachea was drawn in the opposite direction. The picture was that of collapse of the upper lobe of the right lung, due to carcinoma of the eparterial bronchus. Lipiodol was injected and a further picture was taken. Mostly the lipiodol went into the left lung in spite of careful posturing of the patient, but on the upper surface of the right bronchus a meniscus of lipiodol was seen. This was evidently lipiodol banked up against an obstructive lesion in the eparterial bronchus. There was none in the upper lobe, though it was scattered in the lower lobes of the right lung. Dr. Kinsella said that they did not often find obstructive lesions of the eparterial bronchus. It was thought that the case might be favourable for treatment by radon seeds. However, there was some delay, and it was six weeks before the patient was sent to hospital. Within that time the picture had changed and there were dense masses of secondary growth radiating from the hila of both lungs. This fact demonstrated that there should be no delay in dealing with cancer in the bronchus. The first stopping place of the growth was the mediastinal glands, and these were beyond the reach of treatment.

DR. GARNET HALLORAN remarked that a great deal had been said in regard to the rôle of the bronchoscope. Dr. Harvey's words were a call to the profession to see that patients were submitted to early bronchoscopic examination. This had not been done in the past, and taking a bronchoscopic biopsy was not such a simple process as it might appear. In the first place the skill of the operator was not the only factor required; he must have a complete and efficient apparatus, and this was very expensive. No private endoscopist would consider himself adequately armed without apparatus costing at least £200. Yet most large hospitals considered an equipment costing £100 sufficient. However, at the Royal Prince Alfred Hospital £100 had recently been voted for additional apparatus. After the diagnostic biopsy procedure it was usually possible to say whether the growth was malignant, what the type was, and what was its degree of radio-sensitivity. By these means the patient might be saved from the ardent lobectomist and the lung from post-radiation fibrosis. In a small percentage of cases much could be done by radiotherapy. Dr. Halloran did not like the idea of putting radon into the bronchus; it was impossible to tell whether a small area that could be seen was to be radiated or a larger extrabronchial area beyond the growth that could not be seen.

In regard to lipiodol: By what method was it injected? If strictures, ciliary stasis or secretion were present, it was impossible to get lipiodol past them by bronchial injection. But if the lipiodol was injected through the bronchoscope it could be got past strictures and a more accurate skiagram could be obtained.

DR. V. M. COPPLESON expressed his thanks and said that he wished to criticize two statements made by Dr. Harvey. First, Dr. Harvey had said that the future of lung cancer lay with the surgeon. This could only partly be true if one considered the pathology, which was of the greatest importance to the surgeon. What might be expected from the surgeon? Secondary cancer of the lung was beyond his scope. In primary cancer there were types close to the hilum and those at some distance. In those that were close to the hilum, and the majority were of this type, no relief would come from the surgeon. Those in the lung itself might with some advantage be treated by pneumectomy or lobectomy. In the last month Dr. Coppleson had attempted to remove one of these cancers of the lung. The thorax was opened and the lung was found to be atelectatic, the whole of the hilum of the lung was extremely hard, and the hilum was as though it were fixed in cement. It was thus impossible to do anything at all. The implanting of radium was considered, but even this was out of the question. The commonest mediastinal tumour was secondary involvement of glands from carcinoma of the lung.

In the second place, Dr. Harvey had said that thoracotomy was likely to become as easy as laparotomy. Dr. Coppleson mentioned a man who had a mediastinal cyst. Ether was given intratracheally and the operation was performed in two stages. Portions of the rib were removed, the lung did not collapse and there was no trouble. Another case was that of a boy at the Royal North Shore Hospital of Sydney with a sarcoma involving the lower ribs. Four ribs and part of the diaphragm were removed. Throughout there was mediastinal flap, the patient was *in extremis*, but was pulled through the operation. He died later from secondary deposits in his spine. The third case mentioned by Dr. Coppleson was the one of cancer of the lung. Gas and oxygen were given intra-

tracheally and no difficulty was met with in the operation. A fourth case was one in which lobectomy was performed for bronchiectasis; in this case the operation was not so simple as laparotomy. Dr. Coppleson said that one of the main questions was that of anæsthesia. The operations themselves were not of very great difficulty, but the methods of anæsthesia employed needed special skill and knowledge. In the fourth case that he mentioned, Dr. Coppleson said that "Evipan sodium" had been used, then Magill's tube and gas and oxygen intratracheally. It was thought that too high a pressure had been used and the patient suffered from a form of caisson disease during early convalescence. Dr. Coppleson repeated that major thoracotomy was not and probably would never be as simple as laparotomy.

In conclusion, Dr. Coppleson said that he had little to say in regard to the X ray aspects of the problem, except that the diagnosis of this condition would always be the part of the physician and the radiologist.

DR. A. S. WALKER congratulated the speakers and said how vitally essential a knowledge of pathology was both in diagnosis and treatment of cancer of the lung. This was perhaps a truism, but it was essential to attempt to interpret symptoms, such as cough, pain, breathlessness and hæmoptysis, in terms of pathology. Hæmoptysis was the most important symptom. Scott Pinchin and Morlock, of London, thought that all patients with unexplained hæmoptysis should be submitted to exploratory bronchoscopy. It was necessary that the person who used bronchoscopy should be interested in pulmonary disease. It was necessary also for the physician and the radiologist to be interested in pulmonary disease and versed in its pathology. They should be able to recognize the characteristic radiological appearances. They should know how collapse could be brought about and how the trachea could be distorted and dragged over. Dr. Walker had seen these facts omitted from radiologists' reports. In regard to the radiologist's complaint that no history or details of the case were given him, Dr. Walker said that the remedy was in the radiologist's own hands—in such circumstances he should refuse to report on the condition.

The surgeon dealing with thoracic cases should be specially skilled in and interested in pulmonary disease. It was essential that such patients should be the particular care of the surgeon and physician acting together. This again became a matter of pathology. Dr. Coppleson's contribution to the discussion regarding metastases pointed this out. The literature laid stress on the variable time at which metastases appeared in cancer of the lung. Some cases were apparently without metastases, in some the metastases came later, and in some they were distinct at an early stage in the disease.

Dr. Walker said that he could not altogether think that the time would come when the surgeons would play a more important part than physicians and radiologists in the treatment of lung cancer. But there would be a small and growing number of cases successfully treated. Dr. Walker stressed the responsibility of the medical practitioner in making an early diagnosis.

In conclusion, Dr. Walker said that it was not impossible for people to have, with cancer of the lung, coincident tuberculosis. Davidson said that 6% of people with proved cancer of the lung had tubercle bacilli in their sputum.

Dr. Cotter Harvey, in reply, thanked those who had taken part in the discussion, and said that several interesting points had been mentioned. The showing of other cases by members had demonstrated that cancer of the lung was seen by all, and Dr. Harvey hoped it would not be taught to students that this was a rare disease.

In regard to radiology, Dr. Harvey pointed out that in some patients with radio-opacity of one side of the chest, radiotherapy might result in an almost complete clearing within a short space of time. This, of course, did not indicate a corresponding diminution in the size of the growth, but merely showed that there had been a complete bronchostenosis with atelectasis and the shrinkage of the growth resulting from treatment had allowed the lung to reexpand.

Replying to Dr. Thomson's remark on the rarity of females with cancer of the lung coming to *post mortem* examination, Dr. Harvey said that this might partly be explained by their not being taken so often to *post mortem* examination and by their not dying so often in hospital. But it was agreed by almost all observers that males far outnumbered females in their susceptibility to cancer of the lung.

Dr. Harvey was glad that members concurred as to the value of lipiodol. He agreed with Dr. Blashki that it might be best to give lipiodol with the bronchoscope, provided it was given under local anæsthesia.

Dr. Susman and Dr. Halliday had spoken of radon and its use. It was worth while as a palliative measure, but gave no hope of cure.

In reply to what Dr. Badham said concerning dust in the causation of cancer of the lung, Dr. Harvey thought still that the lung might be damaged to such an extent that carcinogenic substances could more easily operate. The fact must not be overlooked that all the Schneeberg miners dying of carcinoma of the lung were found *post mortem* to have an extensive pneumonokoniosis. As to the effect of tar, Dr. Harvey said that Komura and others had brought forward evidence that bronchial carcinoma could be produced in mice by painting them with tar.

Dr. Kinsella had made a point of the need for early treatment. As Dr. Halloran had said, bronchoscopy had been a Cinderella for many years. The obtaining of a diagnosis by biopsy would often give an indication as to the best method of treatment to adopt.

In reply to Dr. Coppleson's criticism, Dr. Harvey agreed there was a broad division of primary lung cancers into (*a*) hilar and (*b*) peripheral growths, and that the former were rarely operable. He insisted, however, that in the first three cases he had shown the growth had not been close to the hilum when first diagnosed, and that operation at that stage might have been successful. Dr. Harvey considered that in the majority of cases secondary glands did not form a tumour mass until the late stages.

In regard to operative measures, it appeared that Dr. Coppleson and he were at cross-purposes. In saying that thoracotomy involved no greater risk than laparotomy, he had been quoting Tudor Edwards, who, however, had added "in the hands of a skilled surgeon". A simple exploratory thoracotomy was one thing; a lobectomy was quite another. He fully endorsed Dr. Coppleson's views on the dangers and difficulties of major thoracic surgery, a branch in which Dr. Coppleson had had considerable experience, and he would pay tribute to his zeal and surgical skill in that highly specialized field.

Dr. Harvey had been very glad to hear Dr. Walker speak, with his customary breadth and view and balanced judgement. He welcomed his insistence on a knowledge of pathology as an essential preliminary, and his opinion on the significance of hæmoptysis and X ray findings, and especially on the need for the surgeon specialist. This need would undoubtedly increase in the future, but at the same time only a small percentage of patients would be operable.

ANNUAL MEETING.

THE annual meeting of the Tasmanian Branch of the British Medical Association was held at the Tasmanian Museum on February 22, 1936, DR. G. E. CLEMONS, the President, in the chair.

Annual Report of Council.

The annual report of the Council was read and adopted. The report is as follows:

The Branch Council has pleasure in presenting its annual report for year 1935, as follows:

The membership of the Branch, which was 73 at the beginning of the year, was 86 at the beginning of 1936. One new member has been elected, four have transferred into the Branch, 20 have resumed membership by payment of the overdue subscription within the period of grace,

while six have left the State, and six members lapsed on the first of January, 1936, through non-payment of their subscription for 1935; but some of these have since resumed their membership.

Since the last annual meeting there have been held eight ordinary meetings of the Branch, the average attendance being 15·25, compared with 15·3 in the previous year.

Papers have been read by Dr. Carruthers, Dr. Hamilton, Dr. Hiller and Dr. F. Gaha, while clinical notes have been contributed by Dr. Shugg, Dr. Fay and Dr. Atkins.

Eighteen meetings of the Branch Council have been held, the attendance being as follows:

Dr. Stoddart Barr	18	Dr. Gibson	13
Dr. Brettingham Moore	17	Dr. Shugg	5
Dr. Fay	13	Dr. T. Giblin	9
Dr. Atkins	3	Dr. J. Walch	18
Dr. Crowther	18		

The northern members of the Council, Dr. G. E. Clemons and Dr. Grove, have not attended. Dr. Atkins's absence from many meetings was enforced by ill-health, and in October his resignation from the Council was accepted with regret. In December Dr. Shugg found it necessary to resign from his position as representative on the Federal Council, and the Branch Council resolved that their great appreciation of his services to the Branch be placed on record.

The Council has given much consideration during the year to the hospital problem in Hobart. Under instructions from a meeting of the Branch it appointed a legal representative to attend the Royal Commission on the Hobart Public Hospital with a view to protecting the Association from misrepresentation. Committees have been appointed to consider community hospital and contributory schemes; and several conferences with the Board of Saint John's Hospital have been held to discuss these schemes. There is also a committee obtaining information on the subject of national health insurance.

Legal opinion was obtained on the liability of the Branch to pay income tax. We are informed that there is no such liability.

In the early part of the year consideration was given to the financial position of the Branch; but the Council considered that the general position was not unsatisfactory.

A committee held a conference with representatives from the Pharmacy Board, as a result of which certain recommendations were approved by the Council and embodied in a circular sent to members.

A very successful post-graduate course, arranged by the Northern Division, was held in Launceston in November.

Dr. G. E. Clemons and Dr. Stoddart Barr were appointed delegates from the Branch to the annual meeting in Melbourne, while Dr. T. Goddard represented the Branch at the annual representative meeting in London.

Dr. Shugg having resigned from his membership of the Federal Council, Dr. Crowther was appointed to represent the Branch with Dr. S. Gibson.

Financial Statement.

The financial statement for the year ended December 31, 1935, was received. The financial statement is published herewith.

Induction of President.

Dr. G. E. Clemons then inducted Dr. E. Brettingham Moore to the office of President for the ensuing twelve months.

President's Address.

Dr. G. E. Clemons then read his retiring President's address. He chose as his subject "Aspects of Head Injuries". He first of all stressed the large increase of head injuries following motor accidents, and drew up a classification of the types of head injuries and their severity. He spoke particularly of injuries seen recently by himself and his colleagues at the Launceston Hospital.

Dr. Clemons drew the attention of the meeting to the distribution and course of the cerebral veins and demonstrated a specimen of a dissected head that he had prepared. It showed that the anterior veins (about a dozen in number) were very short and ran transversely

The British Medical Association (Tasmanian Branch).

Statement of Receipts and Payments for the Year ended December 31, 1935.

Receipts.

	£	s.	d.
To Balance as at January 1, 1935	284	9	10
„ Members' Fees	465	19	6
„ Member's Fee collected on behalf of Malayan Branch	2	10	0
„ Fixed Deposit matured	300	0	0
„ Interest on Fixed Deposit—			
E. S. & A. Bank	4	10	0
Hobart Savings Bank	4	8	0
„ Interest on Debentures, Australasian Medical Publishing Company, Limited	4	2	4
„ Interest, Commonwealth Inscribed Stock	3	2	8
	£1,069	2	4

Payments.

	£	s.	d.
By Australasian Medical Publishing Company, Limited	160	2	6
„ Remittance to London (Capitation Fees)	204	0	9
„ Federal Council (Branch Contribution)	8	18	0
„ Southern Division Grant	22	5	0
„ Northern Division Grant	20	10	0
„ Purchase Commonwealth Inscribed Stock (£300)	298	10	0
„ Remittance to Malayan Branch	2	9	11
„ Secretary's Honorarium	30	0	0
„ Rent, Royal Society	10	0	0
„ Legal Fees, Murdoch, Cuthbert and Clarke	144	9	6
„ Duplicating, Printing and Stationery	6	19	11
„ Secretary's Petty Cash and Assistant's Salary	21	11	11
„ Bank Charges *et cetera*	0	18	6
„ Balance	138	6	4
	£1,069	2	4

Statement of Assets.

	£	s.	d.
Furniture at Library	20	0	0
Cash at E. S. & A. Bank	133	18	4
Fixed Deposit at E. S. & A. Bank	100	0	0
Commonwealth Inscribed Stock	298	10	0
Fixed Deposit with Hobart Savings Bank, with Interest	163	15	11
Australasian Medical Publishing Company, Limited, Debenture	95	0	0
	£811	4	3

Audited and found correct.

Adams and Bennett,
Chartered Accountants (Aust.),
Auditors.

to join the superior longitudinal sinus. The middle veins were much longer and joined the sinus obliquely. As a result, after trauma due to a fall or blow on the occiput or frontal region, the anterior veins were much more likely to rupture. The Professor of Surgery at the University of Sydney, in a recent paper, advised and stated that he practised the making of two trephine openings of the frontal region in cases of subdural hæmorrhage, because he found the clot most frequently there; but he did not give the reason for the procedure.

Dr. Clemons went on to say that if his reading as to the cerebral veins was correct, it explained why one should trephine in the frontal region. He then touched on the clinical signs and other aspects of head injuries.

Dr. Brettingham Moore then conveyed the thanks of the meeting to Dr. Clemons for his address.

Annual Dinner.

In the evening the annual dinner was held at Hadley's Hotel, and Dr. Goddard related to the gathering some of his experiences whilst on a tour of the United Kingdom and his impressions of the annual meeting, which he attended as a delegate of the Branch.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Watson, Alexander Thurston, M.B., B.S., 1933 (Univ. Sydney), 10, Church Street, Canterbury.

Latham, John Victor, M.B., B.S., 1935 (Univ. Sydney), 9, The Grove, Roseville.

Medical Societies.

THE MEDICAL WOMEN'S SOCIETY OF NEW SOUTH WALES.

THE annual meeting of the Medical Women's Society of New South Wales was held at the Maitland Lecture Theatre, Sydney Hospital, on March 25, 1936, Dr. Marjorie Little, the President, in the chair.

Election of Office-Bearers.

The following office-bearers were elected for the ensuing twelve months.

President: Dr. Margaret Harper.
Vice-Presidents: Dr. Ida Saunders, Dr. Adele Aitken.
Secretary: Dr. Phyllis Anderson.
Treasurer: Dr. Willa Nelson.
Committee: Dame Constance D'Arcy, Dr. Elma Sandford Morgan, Dr. Theresa Carmichael, Dr. M. Edelstone Pope, Dr. Ruth Heighway, Dr. Nell Farrar, Dr. Florence Voss.

Annual Report.

The annual report of the Committee was received. The report is as follows:

Honour for Member.—The name of Dr. Constance E. D'Arcy appeared in the Birthday Honours list, the King having conferred on her the order of Dame of the British Empire. The Society feels extremely proud that such fitting recognition has been made of Dame Constance's work.

Death of Member.—The Society has suffered a grave loss in the sudden death of Dr. Leila Keatinge after an operation for appendicitis. A personal friend of many, the whole profession knew her as a tireless and enthusiastic worker in the field of radio therapeusis; her passing has left a gap which will not easily be filled.

Australian Federation of University Women.—A meeting was held in Melbourne on September 10. Eight delegates from the Medical Women's Society of New South Wales attended. Affiliation with the International Federation of Medical Women was decided upon, the basis of subscription discussed, and a working arrangement evolved.

The question of medical women practising in a State which did not possess a Medical Women's Society, and a motion passed to the effect that the A.F.M.W. refer to the State societies the question of including in their membership medical women resident in an adjacent State or the Federal Capital Territory where there is no society.

Annual Meeting of the British Medical Association.—Members of this Society were entertained at dinner by members of the Victorian Medical Women's Society, and also at many private functions.

The fleeting visit of the overseas members of the British Medical Association gave little opportunity for organized entertainment, but one motor trip was arranged, on which a visit to Koala Park proved most interesting, and later overseas visitors enjoyed afternoon tea at the home of Mrs. J. Cuthbert, the mother of one of our members, whose hospitality was greatly appreciated.

Individual members arranged small parties on the return of the British Medical Association party, and great regret was expressed at the shortness of the stay.

Membership.—The membership of the Society now stands at 79, while 11 are in England and 3 removed to other States.

The average attendance at meetings during the year was 24·5 and your committee hopes that the figure will improve in the coming year, in appreciation of the high standard of subject matter offered and in recognition of the work entailed for those who are good enough to present it.

Scientific Meetings.—A paper on malignant disease of the ovary, fully illustrated by lantern slides and diagrams, was presented by Dame Constance D'Arcy on March 28, together with results of treatment and the value of early diagnosis.

A paper on "Some Difficulties in Infant Feeding" was given by Dr. Margaret Harper on August 8, and gave rise to much discussion of practical methods. As a result of interest expressed, a visit to the Tresillian Mothercraft Training School was arranged on a date thought suitable to those present. The Committee was very disappointed at the small number who availed themselves of the excellent demonstration arranged.

Social Meetings.—A late afternoon party was arranged at the Macquarie Club on June 13 in honour of Dame Constance D'Arcy, at which 26 members were present, and congratulatory messages were received from large numbers of those unable to come.

The Annual Dinner.—The annual dinner was held this year at the Carlton Hotel, when 50 members were present. The change was voted a success, and the function an enjoyable one.

PHYLLIS M. ANDERSON,
March 25, 1936. Honorary Secretary.

The Red Blood Cell.

Dr. Marjorie Little read a paper entitled "The Red Blood Cell."

Post-Graduate Work.

GENERAL REVISION COURSE IN SYDNEY.

THE New South Wales Post-Graduate Committee in Medicine announces that the general revision course will be held in Sydney from Monday, May 25, to Friday, June 5, 1936. A full daily programme has been arranged at the following hospitals: Lewisham Hospital, Prince Henry

Hospital, Royal Alexandra Hospital for Children, Royal Hospital for Women, Royal North Shore Hospital, Royal Prince Alfred Hospital, Saint Vincent's Hospital, The Sydney Hospital, The Women's Hospital (Crown Street), Tresillian (Vaucluse) Mothercraft Home.

Railway concession tickets are available to members attending the course, also to their wives, daughters and sons under sixteen years of age. In the case of interstate travellers the concession is applicable to a minimum of six members from each State, except when travel is made through three or more States, when the minimum is three. If less than the prescribed number travel from any State, the difference between concession allowed and the full fare must later be refunded.

Synopses of all lectures and demonstrations will be made available to all those attending the course.

Several leading hotels will give concession rates to those attending the course. Further information concerning this may be obtained on application to the Secretary.

The fees for the course and lectures will be £3 3s. Those attending mornings only, afternoons only or for one week of the course will pay £2 2s. For hospital resident medical officers and those not engaged in active practice the fees will be half the above.

Applications and any requests for information should be made to the Secretary, New South Wales Post-Graduate Committee in Medicine, the University of Sydney, and cheques should be made payable to the Post-Graduate Fund in Medicine, the University of Sydney. Exchange should be added to country or interstate cheques.

Copies of the full programme of the course and of other courses to be held during 1936 will be posted to any medical practitioner who applies to the Secretary.

Correspondence.

THE DELAYED MOLONEY REACTION.

Sir: Lest undue alarm should arise over the article by C. R. Merrillees in The Medical Journal of Australia, April 11, 1936, page 503, I hasten to state the results in the matter under discussion in so far as our experience in Hindmarsh, South Australia, has enabled us to judge on the matter of the delayed Moloney reaction described by E. A. Underwood, *The Lancet*, Volume I, 1934, page 678.

In approximately 1,200 Moloney tests performed since March 3, 1936, we have found approximately 10% positives and two so-called "Taylor" reactions, or delayed Moloney reactions, or +D Moloney reactions, as described by Underwood, who (*Journal of Hygiene*, December, 1935, page 449) found a percentage of 1·69 in 2,666 cases. He describes the reaction as manifesting itself on the seventh day after infection, possibly developing about the fifth or sixth day. The delayed reaction is much less intense than the Moloney reaction.

These statements are borne out by our experience, and in the two delayed reactions that we know of in our series one of the cases had a sore arm with erythema three and a half inches in diameter, red, indurated, with some axillary adenitis and pain on moving the arm. This was the sixth day after receiving 0·5 cubic centimetre of anatoxin and the seventh day after receiving the Moloney injection, which now showed an area one inch in diameter and was indurated, swollen and dusky red. The other of our cases showed no ill effects; indeed, as Underwood says: "The delayed Moloney reaction . . . is in effect a reaction which is so mild that it fails to appear at the usual time", and he appears to have no hesitation in immunizing the mild reactors, and in fact lays down definitely that the extent of the Moloney reaction is no indication of the extent of the reaction likely to follow the administration of anatoxin in prophylactic doses. Our experience bears this out in a negative way, in that in Moloney-negative cases we have had to date at least seventeen reactions at the site of injection of immunizing doses similar to the reaction described above, and one or two mild Moloney-positives who were done by mistake showed no reaction from the initial 0·5 cubic centimetre and, when this was found to be so, to a subsequent 1·0 cubic centimetre.

It is interesting to note (*Journal of Hygiene*, December, 1935, page 512) Maurice Mitman states that the intradermal toxoid test of Moloney and Zoeller corresponds exactly with the pseudo-response in the Schick test, but there is not sufficient evidence for Merrillees's statement that all "Taylor" reactors react to the Schick test, even if in the majority of cases it is so.

One does not like to have the bogy of Bundaberg brought to light at the present time, when different methods of immunization are being used and when health authorities are endeavouring to carry out immunization campaigns against diphtheria.

Yours, etc.,

John M. Dwyer,
Officer of Health,
Hindmarsh, South Australia.

April 17, 1936.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A meeting of the Senate of the University of Sydney was held on April 6, 1936.

The following degree was conferred:

Master of Surgery (Ch.M.): Harry Leaver.

The following post-graduate scholarship was awarded:

James King of Irrawang Travelling Scholarship: Miss Daphne A. Stephan. Miss Stephan has qualified for graduation in the Faculty of Science with first class honours in mathematics and first class honours and the University medal in chemistry. Throughout her university career she has displayed ability of a very high order as a research student. She proposes to engage in research work in chemistry at the University of Cambridge.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

The undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1935*, of Queensland, as duly qualified medical practitioners:

Brent, Richard Hillier, M.B., B.S., 1933 (Univ. Sydney), Taroom.

Bryan, Sidney William, M.B., B.S., 1933 (Univ. Sydney), Isisford.

Burne, Alfred Rainald Keith, M.B., Ch.M., 1926 (Univ. Sydney), Wynnum.

Courtney, Thomas Richard Brian, M.B., B.S., 1935 (Univ. Melbourne), Brisbane.

Croll, Darcy Graham, M.B., B.S., 1934 (Univ. Sydney), Brisbane.

Gumley, Albert John, M.B., B.S., 1934 (Univ. Melbourne), Townsville.

Inglis, Alexander, M.B., B.S., 1929 (Univ. Sydney), Brisbane.

Kelly, Thomas Francis, L.R.C.P. & S. (Edinburgh), L.R.F.P.S. (Glasgow), 1924, Brisbane.

Norrie, Harold Francis Joseph, M.B., Ch.M., 1913 (Univ. Sydney), Sydney.

Corrigendum.

Dr. T. W. Lipscomb writes that in his appreciation of the late Dr. William Henry Crago in the issue of April 4 he was in error in the details that he gave of the history of *The Australasian Medical Gazette* and its being acquired by the New South Wales Branch from its previous lay ownership.

It was the late Dr. Huxtable, and not Dr. Fortescue, who worked so hard with Dr. Worrall, and it was owing to their efforts that the gazette was firmly established to the Branch.

Diary for the Month.

Apr. 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Apr. 30.—South Australian Branch, B.M.A.: Branch.
Apr. 30.—New South Wales Branch, B.M.A.: Branch.
May 1.—Queensland Branch, B.M.A.: Branch.
May 4.—New South Wales Branch, B.M.A.: Organization and Science Committee.
May 5.—Tasmanian Branch, B.M.A.: Council.
May 6.—Western Australian Branch, B.M.A.: Council.
May 6.—Victorian Branch, B.M.A.: Branch.
May 7.—South Australian Branch, B.M.A.: Council.
May 8.—Queensland Branch, B.M.A.: Council.
May 12.—Tasmanian Branch, B.M.A.: Branch.
May 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
May 19.—Tasmanian Branch, B.M.A.: Council.
May 19.—New South Wales Branch, B.M.A.: Ethics Committee.
May 20.—Western Australian Branch, B.M.A.: Branch.
May 22.—Queensland Branch, B.M.A.: Council.
May 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments.

Dr. B. J. Hallion has been appointed Medical Officer of Health by the Rockingham District Road Board, Western Australia.

* * *

Dr. S. W. Rees has been appointed Health Inspector by the Rockingham District Road Board, Western Australia.

* * *

Dr. H. R. Cope has been appointed Government Medical Officer at Goulburn, New South Wales.

* * *

Dr. W. Kent Hughes, pursuant to the provisions of the *Workers' Compensation Act*, 1928, has been appointed Certifying Medical Practitioner and also Medical Referee at Melbourne, Victoria.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xiv and xv.

Austin Hospital for Cancer and Chronic Diseases, Heidelberg, Victoria: Honorary Officers, Resident Medical Officer.

Department of Public Health, Sydney, New South Wales: Medical Officers.

Kalgoorlie District Hospital, Kalgoorlie, Western Australia: Resident Medical Officer.

Launceston Public Hospital, Launceston, Tasmania: Medical Superintendent.

Mothers' and Babies' Health Association (Incorporated), Adelaide, South Australia: Honorary Medical Officer.

South Otago Hospital Board, Balclutha, New Zealand: House Surgeon.

Tara District Hospital, Tara, Queensland: Medical Officer.

Yallourn Hospital, Yallourn, Victoria: Junior Resident Medical Officer.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
New South Wales: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
Queensland: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Richmond District Hospital, North Queensland. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
South Australian: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
New Zealand (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

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